

Municipal Journal

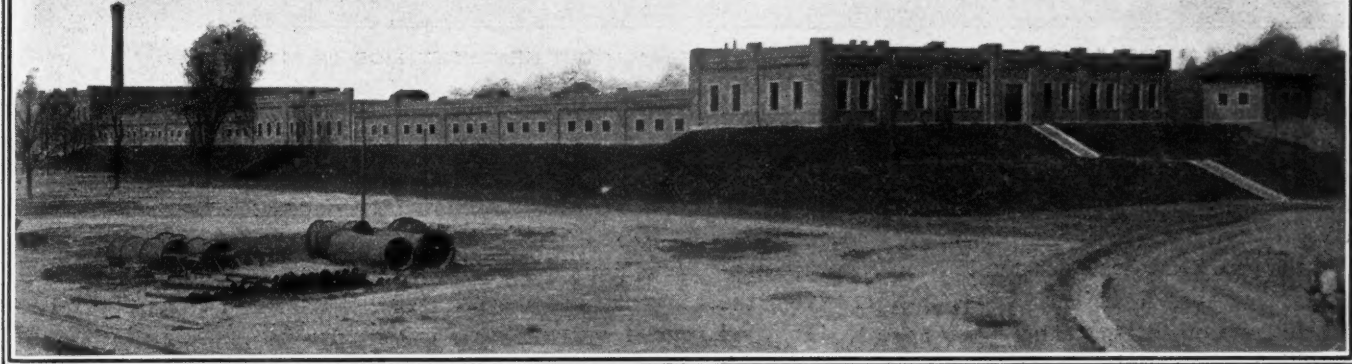
And Engineer

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CINCINNATI'S WATER FILTRATION PLANT



GENERAL VIEW OF FILTRATION PLANT

FOR the first time in its history Cincinnati, Ohio, is enjoying a pure, clean supply of water. Since the starting of the first private plant in 1803 the water has always been turbid and often contaminated. But now, thanks to the hard work of all who have been connected with the project, the city has a satisfactory supply. G. H. Benzenberg, formerly consulting engineer on the work, has for the the past four years been Chief Engineer. S. G. Pollard is Superintendent of the mechanical side of the plant, and J. E. Ellms is Superintendent of the filtration plant, and to these gentlemen and to August Herrmann, President of the Water Works Commission, we are indebted for much of the following information.

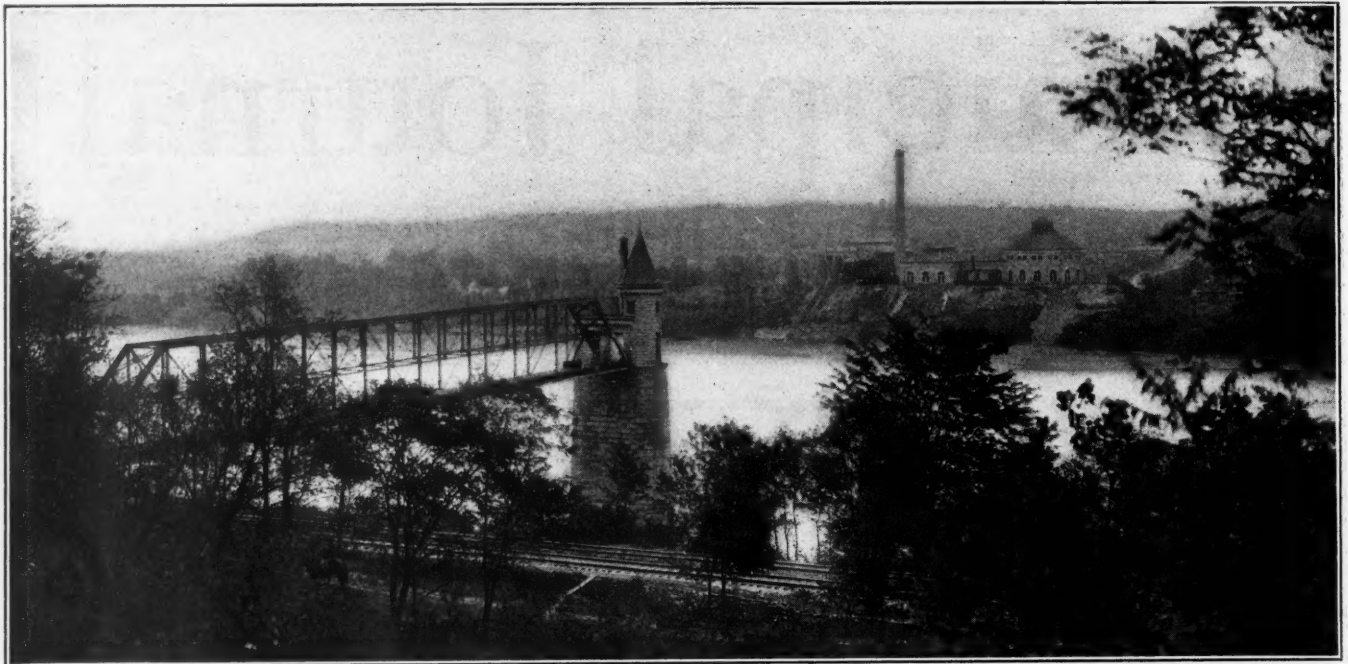
The intake and the filtration plant are located some eight miles above the city on the Ohio River at a village called California. The intake pier is built near the Kentucky shore of the river, because on that side the river is kept deeper by the current. Water is admitted through six gates, each four by six feet. These are provided with basket screens, which can easily be removed and cleaned. Connecting the intake pier with the pumping station on the opposite side of the river is a seven-foot conduit, which is constructed in bed rock 100 feet below the mean level of the river. This conduit is 1,425 feet long, and not only serves to carry the water to the pumps, but contains the wash-water pipes and electric

cables running to the intake house. Provision is made for pumping this dry with a Wood propeller pump, if it is necessary at any time.

FILTER PLANT PUMPING STATION

In the accompanying illustration of the filter plant pumping station, the circular part to the right is the pump house. The construction of this offered some little difficulty, which was overcome by the use of a wooden caisson. This was sunk to the proper depth and was decked over by a floor of 12 x 12 oak timbers 12 feet thick, supported on cross walls 3 x 8 feet, and the pump-house walls were built around the edge of this. The interior diameter of the house is 98 feet.

Owing to the rise and fall of the river the deck covering was unstable, in fact varied as much as 6 inches and acted very much as the bottom of a dish pan might. To overcome this a counterweight of cast-iron blocks, laid in Portland cement and weighing 4,200 tons, was constructed around the central water shaft. This was supplemented during construction by flooding with water and the floor was thus brought to within one thirty-second of an inch of its original position before it was loaded with the machinery, and by careful calculation was kept at that point during the erection of the 6,000 tons of machinery. Since the completion of this there has been absolutely no change, but provision has been made for flooding if it should prove necessary.



HEAD HOUSE AND FILTER PUMPING STATION, FROM KENTUCKY SIDE OF RIVER

Rising in the center of the pump house is a central water shaft from which the engines take their supply. This is provided with an elevator for lowering men and materials in case any cleaning of the tunnel should be necessary.

In the pump house are located the four tallest pumping engines ever built, each being 109 feet from the base foundation to top. The engines are R. D. Wood 30-million-gallon triple expansion engines supplied with surface condensers, which maintain a vacuum of 27 inches. The steam cylinders are 29, 54 and 82 inches, and the water cylinder $37\frac{1}{2}$ inches in diameter, all with 96-inch stroke. The speed is $15\frac{1}{2}$ r. p. m. These engines each weigh approximately 1,250 tons. There is a combined machinery weight of 6,000 tons on the roof of the caisson.

For handling the machinery a crane is provided, one end of which is carried on a circular track fastened to the wall of the building, and the other supported on the central shaft.

All valves in connection with the pump house are hydraulically operated Wood valves.

The steam plant for the pumping house consists of eight 200-horse power Stirling boilers fitted with American Underfeed stokers. Buffalo forge blowers are used for induced draft, and two independently fired Foster superheaters are used.

Steel storage bins for coal, with a capacity of 7,000 tons, or enough to run seven months, are located adjacent to the boiler room. By means of an inclined railroad coal can be taken from river boats, or cars can be run in on a spur track. An industrial railroad connects the coal bins with the boiler room, and is used for both bringing in coal and removing ashes. This road also runs to the filter plant some little distance away. A Westinghouse-Baldwin storage battery electric locomotive hauls the cars.

The electrical equipment consists of three 150 kw. Crocker-Wheeler generators direct-connected to De

Laval turbines, which make 900 r. p. m. There is also one 75 kw. Northern generator direct-connected to De Laval turbines which makes 900 r. p. m. There is also one 75 kw. Northern generator direct-connected to a Russell engine. All machines operate at 220 volts. This plant furnishes all power for lighting, for operating machine motors where necessary, and for operating the valve motors in the filtration house. All wires, both in the pumping station and running to other buildings, are carried in conduits.

A very complete outfit of Bowser storage and measuring tanks is used for the oil system.

SETTLING RESERVOIRS

From the pumping station the water goes to two settling reservoirs, one with 158 million gallons capacity, and the other with 175 million gallons capacity. These are intended for plain sedimentation without the use of coagulants. While at present only one of these reservoirs is completed, and this is being used continuously, eventually the two will be used alternately.

In constructing these reservoirs, after the necessary excavating and grading, three feet of clay was placed as a lining and thoroughly rolled. On top of this was placed a layer of crushed stone, followed by six inches of concrete, divided into hexagonal sections, as shown in the illustration. This was covered with asphalt, over which was stretched burlap, which in its turn was covered with another layer of asphalt. The whole surface was then paved with brick which were provided with small hubs on either side to insure the desired joint opening. Finally a cement wash was thoroughly brushed over the top. This construction proves to be very water-tight.

FILTRATION PLANT

The main building of the filtration plant houses the offices, laboratories, filtration beds, chemical house and heating plant. Adjacent thereto are the coagulation basins and clear water basin. The last named is now without a roof, but the bottom was constructed with



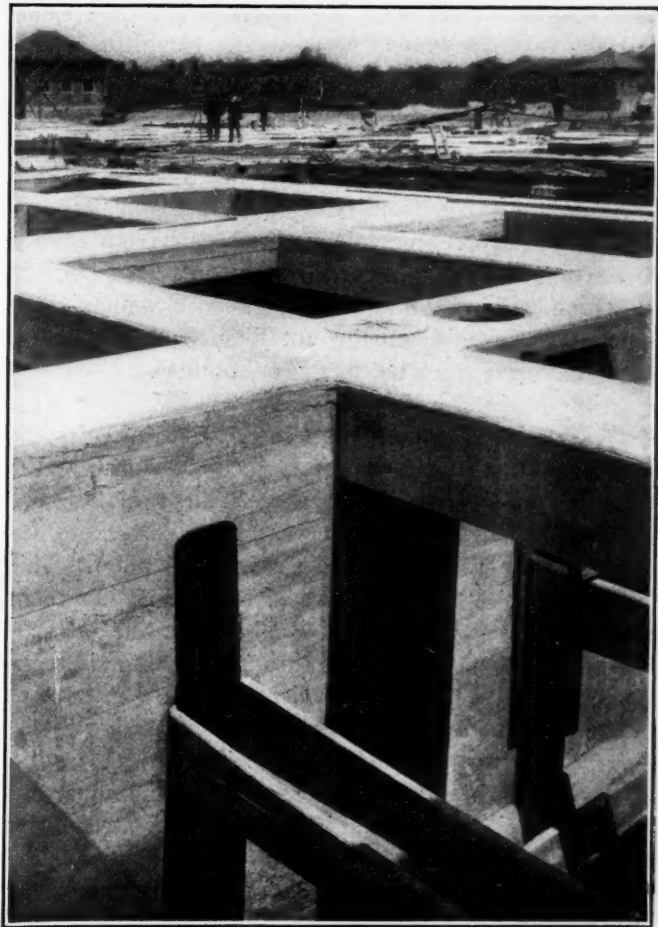
SETTLING RESERVOIR UNDER CONSTRUCTION

pier foundations, so that at any future time a roof can be constructed if necessary.

Water is taken from the settling basins by means of floating pipes, which are automatically kept three feet below the surface, so as not to receive any material that may be floating on the surface. Two 60-inch lines lead to the filter house, and are cross-connected at that point. Six 36-inch pipes connect these with the first chamber. Here the solution of sulphate of iron is introduced through an open pipe, with no special device for mixing. The water then passes through a Venturi meter to a valve chamber, where lime water is introduced, and from there it flows to the coagulation basins. There are two of these, each with ten million gallons capacity, and one of two million gallons capacity. The smallest can be operated in series with either or both the larger ones. No baffle walls are used, and it was stated that very satisfactory results were obtained.

In the settling reservoirs from 40% to 50% of the suspended matter is removed. In the coagulation basins from 30% to 40% additional is removed, and the water going to the filter beds has a turbidity of only ten to fifty parts per million.

The construction of the filter beds and galleries is entirely of reinforced concrete. The filter building is 137x450 feet and contains twenty-eight four-million-gallon units, with a combined capacity of 112 million gallons per day on an area of less than one acre. Each unit is divided into two beds, so that if repairs are



FILTER BEDS BEFORE CONSTRUCTION OF ROOF

Showing bottom offsets, wash water trough, and its connection to main waste discharge.

necessary only part of the unit need be disturbed. During filtration the water level of the unit is the same as that of the coagulating basin.

Previous to adopting a definite design for the filters, many experiments were made, most of them in cases with glass sides, where the action of the sand and water could be observed under all conditions of head, rate of flow, washing with air and water, water alone, determining height of trough and numerous other important features. As a result of these experiments it was decided that washing without air was most satisfactory, as it was found that by properly regulating the flow a complete suspension of the sand resulted. During the operation of washing, the sand rises fifteen to sixteen inches. In settling back into its bed this sand grades itself in an ideal manner, varying from the coarse at the bottom to the necessary film of fine material at the top. It was also determined that the best height of wash water trough was thirty inches from weir edge of trough to level of sand bed. It was found that by first turning on the water slowly the entire dirt film on the surface was picked up and carried to the top without disturbance, after which the washing of the bed was carried on with a vertical rise of water of two feet per square foot per minute. The pressure of the wash water is about six pounds.

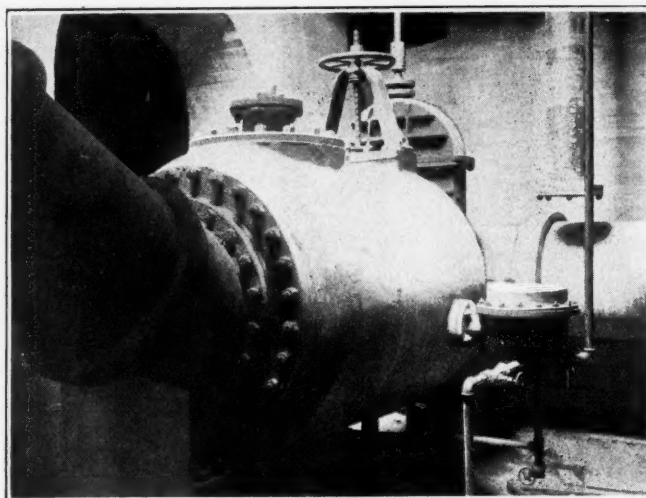
By intelligent use in designing of the data obtained in this experimental way, very satisfactory operation has been secured. The complete suspension of the sand was demonstrated by the use of a rod. While the bed was being washed, the metal screen at the bottom was felt easily with no disturbance of the sand. Borings taken in the beds show the complete gradation of the sand which was anticipated.

The filter bed is constructed with concrete ridges in the bottom, between which gravel is placed. Over the tops of the ridges is fastened a metal screen which prevents the gravel from rising with the sand.

The ordinary running time of a bed is from twenty to thirty hours, but a record has been made of efficient operation with fifty-one hours between cleanings. The time that a bed is actually not filtering water during cleaning varies from ten to fifteen minutes.

In the operation of the valves for cleaning the beds, electric motors are used. These are controlled by the Cutler Hammer system of switches, whereby the throwing of a single switch carries through the complete operation of opening or closing a valve, and automatically stops it at any predetermined point. This makes possible the taking care of the entire filter room with only one attendant.

The rate of flow of water through the filter is regulated by a Vivian rate controller. This controller was devised by Mr. Vivian, an engineer connected with the plant, who was soon afterward killed on the work. After his death patents were secured on the apparatus by other engineers for the benefit of his estate. After setting the rate valve of this controller for any desired flow, this is automatically maintained by means of the auxiliary valve, which operates the main valve. Connection is made from the auxiliary valve to the two



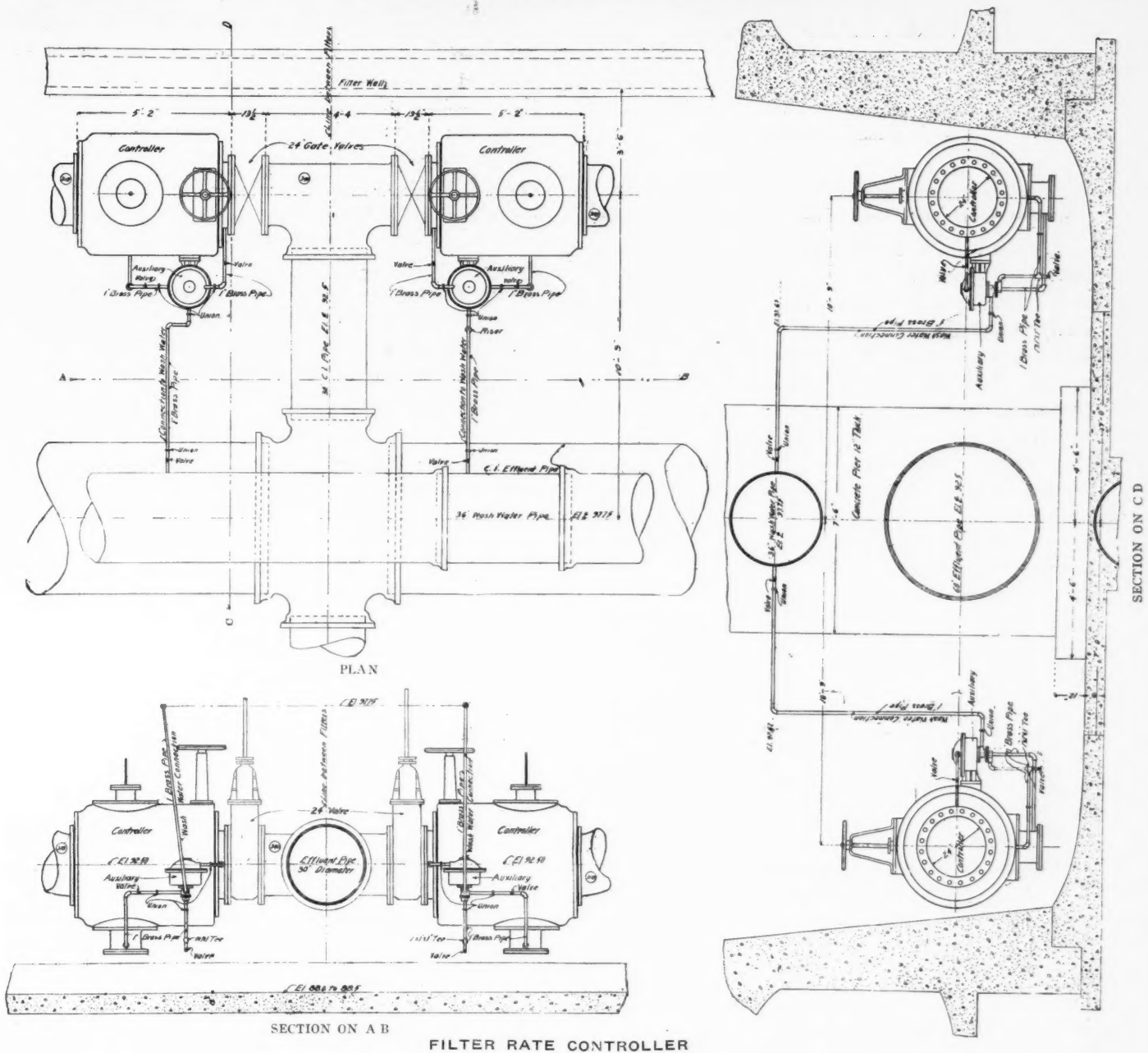
VIVIAN RATE CONTROL VALVE

sides of the rate valve. These two sides are under different pressures, and any change in this difference in pressure will move the auxiliary valve, which in turn operates the main admission valve hydraulically. This method of control is used both on the filter and on the chemical line.

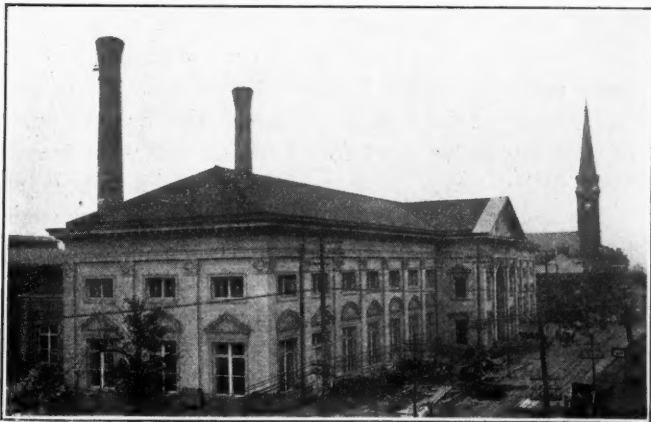
In the chemical room the lime is slaked in tanks to milk of lime and is then diluted in four 25,000-gallon chambers to lime water, in which form it is applied. Slaking is done with water at 140°. The sulphate of iron is dissolved in filtered water, and enters the system as previously mentioned. In the application of the chemical solutions a constant quantity or dose is always used, and the time between doses is varied as the condition of the water may require. This does away with the necessity of having skilled men to regulate the amount of treating material. Two laborers are employed, and their duty is simply to dump in a 100-pound sack of the material whenever the gong rings. The intervals between ringings of the gong have been very ingeniously worked out by a system of interchangeable gears operated by a clock. The superintendent determines the time interval necessary, and puts on the corresponding gears, after which he needs to pay no more attention to it until some change in the water necessitates different treatment. From $\frac{3}{4}$ to $1\frac{1}{2}$ grains of lime and 1 to $2\frac{1}{2}$ grains of iron sulphate per gallon of water are found to be necessary.

In the filter building is also located a steam plant for heating the building in winter, and for furnishing hot water. In the basement under the office there are two motor driven centrifugal pumps having a capacity of 2,500 gallons per minute, which pump filtered water to a small storage reservoir. This water is used for the boilers, for washing the filters, etc. The operation of these pumps is controlled by a float in the reservoir, which connects with a Cutler Hammer switchboard, and automatically stops or starts the pumps.

From the filtered water basin the water runs by gravity through an 84-inch brick tunnel about four and one-quarter miles long, to the main high duty pumping station, located within the city limits. This building is a good example of engineering utility and architectural beauty combined.



It contains room for eight pumping engines. There are now installed for the intermediate service three Holly vertical triple expansion engines, each with a capacity of 25 million gallons per day; the maximum head being 223 feet, and the ordinary 182 feet. The steam cylinders are 32, 60 and 90 inches in diameter.



MAIN HIGH-PRESSURE PUMPING STATION

The stroke is 60 inches, and the speed 20 r. p. m., with a steam pressure of 160 pounds. Six Geary water tube boilers of 200 horsepower each furnish the steam.

For the high service there are three verticle triple expansion engines made by the same company, with capacity of 12 million gallons per day, with a maximum head of 506 feet, and an ordinary head of 450 feet. These have cylinders 34, 64 and 98 inches in diameter and three single acting plungers 26½ inches in diameter. The stroke is 60 inches, the speed is 20 r. p. m., and the steam pressure 160 pounds. Six Geary boilers also supply these, which are 210 horsepower.

An industrial road is used here also for coal and ash handling, and the general equipment is similar to the California plant. Bowser oil storage and measuring devices are used.

As this plant is within the city limits it is subject to the smoke ordinance, and much has been accomplished in reducing smoke trouble by having a bulletin board on which each fireman's smoke record is posted.

FIRE ALARM BOXES

Rule for Proper Distribution—Familiarizing Citizens and Instructing School Children in Their Location and Use—Sample Boxes at Police Stations

BY JOHN J. McMAHON, FIRE CHIEF OF ERIE, PA.

Abstract of Paper Before International Association of Fire Engineers.

As the fire alarm box is the original point from which the signal is put into service, the location of these is of the greatest importance. The only rule that can be safely recommended for their distribution is to place the boxes where they will do the most good, considering in every instance the character of the neighborhood they are to protect. The greater the value of the property hazard the more closely should they be placed.

The boxes should be so distributed that no point of any well-built-up community should be further than 600 feet from one. This would give an officer opportunity to get into immediate communication with his department, if more assistance were needed, without leaving the site of the fire. Boxes by all means should be placed permanently on all theaters, school houses, churches and other buildings used for the accommodation of large assemblages.

Next to distribution the most important point is that citizens should be familiar with the location of the boxes, especially those near their own homes or places of business. Much delay in reaching fires could be avoided if a general interest in this could be aroused.

Not only is the average citizen ignorant of the location of the boxes but he has little or no knowledge of how to use them, although the makers have simplified such use almost as far as it seems practicable to go. The writer believes that the proper way to impress upon the minds of citizens the location of fire alarm boxes is to paint the pole upon which the boxes are located a very bright and striking red in order to make it conspicuous and readily distinguishable from any other pole. If it is a box without a key guard, the keys being distributed among those living in the immediate neighborhood, the names and addresses of the key holders should be painted in striking letters on a metal sign to be fastened directly over the box. If the key is kept in the box at all times, a metal sign having painted on it explanations and illustrations of how to operate the box should be attached to the box or directly over it in a conspicuous place, so that passers-by would be attracted by the sign and could acquaint themselves with the operation of the box. Whenever a new box is erected a member of the department in uniform should go from house to house and inform the occupants of its location and invite them to accompany him to the box where he would instruct them how to operate it; this being repeated each year after the moving season. Cards also should be distributed among the business and resident sections of the city containing descriptions thereon of how to operate the boxes, together with the number and location of the nearest fire alarm box.

A sample box should be erected at the police station, not connected with the alarm service, for use in instructing police officers. The officers should be furnished with a printed list of the numbers and locations of all fire alarm boxes and should be required to commit to memory the location of every box in their respective districts. Watchmen employed by manufacturing and other establishments should receive personal instruction in the use of the boxes. It is also my belief that a disconnected box should be erected on the exterior of every school building and the students instructed in its operation by a member of the fire department, during which instruction there should be firmly impressed upon their minds the danger of maliciously tampering with fire alarm boxes.

NEGLECT OF PUMPING MACHINERY

IN a report to the Mayor and Council of Covington, Ky., a few weeks ago, concerning the pumping machinery and station which he had been requested to examine, Mr. George Hornung described a remarkable condition of affairs.

The pumping engines were in two units, of the vertical rotary type and of duplicate pattern. Each was capable of pumping 4,750,000 gallons in 24 hours. (The present daily maximum consumption does not exceed three million gallons; but the surplus capacity was perhaps fortunate considering the condition of the pumps.) Each engine has two five-ton flywheels, two high and two low-pressure cylinders, and four pumps, one under each cylinder. These four steam cylinders and four pumps are connected to one crank shaft and all must consequently be operated together.

On examining the steam ends of the engines the 24 steam valves and stems were found to be irreparable and had to be replaced with new ones, which also necessitated the reboring of all the valve seats of the chambers. The valve chamber bonnets and caps had to be removed to permit of this and some were found so tightly stuck in the chambers that they had to be broken and removed in pieces. The pins of the valve gear in both engines were found worn oblong. Some were trued up, while others had to be entirely removed, as was also the case with the various rod brasses. Rocking shafts were loose and had oblong bearings which had to be bushed to fit. The bronze shoes of the four cross heads of one engine were so worn as to prevent further use and 24 new ones were supplied. The pitmans which drive the flywheel shafts and the six links which connect the four cross heads with the two beams of each engine were all found having worn-out brasses, loose fitting straps, bent and broken gibs and keys, etc.

For several months preceding these repairs one engine had been operated with a broken crank shaft and flywheel. The shaft was fractured in several places and had been temporarily held together with heavy forged stirrups, and the damaged flywheel had three of its arms broken at the hub.

The condensing system was found to be in bad shape, one receiving chamber being broken and temporarily

patched, the cast-iron heads of both chambers of both condensers cracked, many of the tubes leaking internally and at the heads, the gate valve in a 20-inch pipe broken and the valve stem of a 16-inch gate stripped of its threads.

The pump plungers of both engines were much worn along their centers and because of their variable diameters could not be packed so as to be water tight. One of the valve chambers was found to be leaking slightly through an incipient fracture and another was broken and leaking. The 48 foundation bolts which held the pumps in place were all found to be loose and so wasted away by corrosion that new ones were required. The cast-iron pump rod guides located between the pumps and their corresponding engines were found to be greatly worn and could not properly guide the rods until they had been rebushed.

The one boiler feed pump and feed water heater connected with the plant were worn beyond repair.

The boilers were practically worn out and unsafe and had been in a degree condemned by the Inspector of the Fidelity & Casualty Company. The steam pipe system of the plant was in a leaky and unsafe condition to withstand the boiler pressure needed for operating the engines.

The boilers had previously been reported upon and a contract awarded for new ones in August, 1907, and for a pipe system in November of that year; and both these contracts were completed by February of the present year. The other defects of the plant have been repaired as far as possible, new parts and machinery being purchased where the old could not be placed in good condition. The cost of these repairs amounted to \$13,947 for the steam ends, about \$14,000 for the pump ends and about \$1,400 for miscellaneous repairs and supplies. The new boilers cost \$7,159 and the new steam pipe system \$2,589.

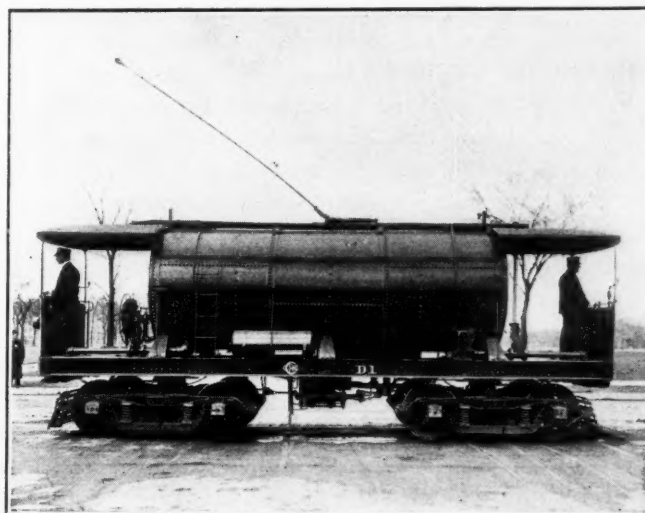
It is to be feared that Covington is not the only city where conditions similar to these could be found. We are not informed concerning the responsibility for permitting this plant to fall into such a deplorable condition; but the experience of other cities has in general been that Council's refusal to appropriate funds for the renewal of worn out machinery or even for necessary repairs is much more common than the carelessness of water works superintendents or engineers. Those who read any considerable number of reports of water works superintendents are familiar with the pleas so often made by these for authority to secure such repairs, frequently coupled with the statement that the same thing had been asked for in several preceding reports. Councils are often ignorant or incredulous concerning the tireless efforts and ingenuity of pumping station engineers and superintendents in endeavoring to obtain uninterrupted service with machinery which should be in the scrap heap. A good pump, by careful and continuous maintenance and making repairs whenever necessary, can be kept doing good service for 25 or 50 years. But if parts are allowed to become loose or worn, the pump may easily rack itself to pieces in a quarter of that time.

RAILWAY SPRINKLING CARS

THE accompanying illustration shows one of the twelve new sprinkling cars recently put in service by the Chicago City Railway Company and which possess several features out of the ordinary.

The cars were designed by the engineers of the company and were built in their own shops. They are officially named New Style M. C. B. Double Truck Sprinkling Cars.

The cars are built entirely of steel and are 29 feet 6 inches long and 7 feet 6 inches extreme width. The floor supports are of channel irons and I beams. Four forty horsepower motors drive the trucks, and the cars are fitted with the regular standard equipment, including air brakes, sanders, etc. The riveted steel tank has a capacity of 40,000 gallons and is supported on the platform by steel blocks. When empty the cars weigh 50,300 pounds, and when loaded 83,850 pounds. The cars cost about \$5,000 each.



TROLLEY SPRINKLING CAR, CHICAGO CITY RAILWAY

As is seen, hoods project from the ends of the tank and protect the motorman and sprinkler operator. The car can be run in either direction and the sprinkling is done from the rear. The sprinkler heads, one over each rail, are controlled from the platform by means of chain and sprockets. Separate valves are also provided in case the heads should leak when not in operation. A reel, furnished with 50 feet of 2½-inch hose, is used for filling. One end of the hose is connected to the hollow shaft of the reel and this in turn is connected with the supply pipe of the tank.

In the operation of these cars the tanks are filled at points where they will not interrupt traffic, either at the ends of the line or at turnouts. About twenty minutes is required for filling, and under ordinary running conditions a full tank will last about forty minutes and cover about four miles of single track. The sprinklers are intended to lay the dust only on the company's right of way, which is 18 inches outside the rail, but actually cover about 24 inches outside. Under the company's charter they are obliged to sprinkle their own right of way, and this means is cheaper than horse-drawn carts. The company pays the city \$25 per year per car for the water used.

NEW PAVEMENTS AND CONSTRUCTION METHODS

Description of the Latest Forms of Concrete and Bituminous Pavements—Papers Before American Society of Municipal Improvements—Hassam, Imperial, Mineral Rubber, Blome—Brick Pavements

At the Atlantic City convention of the American Society of Municipal Improvements October 21, representatives of various paving companies and others endeavored to inform the members concerning their respective pavements by means of samples of materials, photographs and formal papers. Several of the last are abstracted below. A paper on brick paving, which elicited much favorable comment, is included with them.

CONSTRUCTING BRICK PAVEMENTS

Will P. Blair, Corresponding Secretary of the National Paving Brick Manufacturers' Association, forcefully presented a number of details which he considered essential to the construction of a good brick pavement. Beginning with the foundation, Mr. Blair said that this should be constructed with as much care as though for the foundation of a building. It should have the proper thickness, should be carefully mixed and should have sufficient water added so that one man can smooth the top with an ordinary shovel, and the use of a rammer should never be necessary. Especial emphasis was laid on the surface. The eye should not be relied upon for obtaining uniformity, but grade stakes should be set not more than 4 or 5 feet apart, and a greater variation at any spot than 1 inch is absolutely unpermissible. To permit of this, no stone larger than 2 inches should be used in the concrete.

The sand cushion should be 2 inches in thickness; no more and no less. If less than 2 inches it will not afford sufficient cushion for receiving the impact of travel. If more than 2 inches it cannot be sufficiently compacted to firmly support the brick and prevent cracking of the filler. This two inches was determined by years of practice and not theoretically. An expansion joint should be placed along each curb, but not transversely. These joints should vary in thickness according to the width of the street, ranging from one to one and one-half inches.

The brick should be delivered to the brick layer, not by dumping them from a barrow, which is apt to chip both the brick in place and those so dumped, but should be brought upon a board or by use of a gravity carrier, each brick being previously placed with its best face uppermost so that the layer can place them rapidly in position without inspecting each one. Ordinary workmen can quickly be trained to properly stack the brick for the layer, placing undermost the edge which has been burned too hard, has chipped corners, warped edges or kiln marks. A sufficient space should be left between the bricks to permit the introduction of cement jointing material. If this space is so small that the cement cannot enter, the corner of the brick will fail to receive the reinforcement due to the same. All inspection and resetting or changes of brick should be done before rolling. The roller should be a light one

weighing from four to five tons. The rolling should begin along each curb lengthwise of the street, working toward the center, then cross rolling at angles of 45 degrees, this alternate longitudinal and cross rolling being continued until the bricks are thoroughly forced into the sand and inequalities of the cushion ironed out by the rising of the sand into the joints. In a street properly rolled the sand is found to rise from one-half inch up to even one inch into the joints. The use of either horse rollers or eight to ten-ton steam rollers causes the brick to creel, and continued rolling with them causes it to become rougher rather than smoother. Also cross rolling at the required angle is impossible.

After rolling is completed the brick should be wet down, it being imperative to distribute the water in the finest spray only by use of a nozzle upon a sprinkling can or hose. Mr. Blair finds that more incorrect and faulty methods are employed in applying cement filler than in any other portion of the work. The lower part of the joint should contain one part cement to one of sand and the upper part two parts of cement to one of sand. The sand should be clean and sharp. The sand and cement should be mixed together dry in quantities not exceeding one-third of a bushel until of uniform color and then mixed with water to obtain the consistency of thin cream. The grout should not be too thin. From the time the water is applied until the last drop is removed and floated into the joints the grout must be kept in constant motion. The mixture must be removed from the box to the street with a scoop shovel, all the time being stirred, and as soon as it touches the brick shall be continuously moved over the pavement by brooms until it has all entered the joints. The box for mixing the grout must be $3\frac{1}{3}$ to 4 feet long, 27 to 30 inches wide and 14 inches deep, resting on legs of different lengths so that the mixture will readily flow to a lower corner. There should be one such box for every 10 feet width of street or fraction thereof. As soon as 15 to 20 yards has been covered in this way the boxes must be carried back to the starting point and the same area be covered again in the same way, except that the grout shall be two-thirds cement to one-third sand. To avoid the absorption of water out of the grout by dry brick, the pavement should be sprinkled gently by a can just ahead of the grout sweepers. Within one-half to three-fourths of an hour after this last coat is applied and the grout between the joints has fully subsided and while the initial set is taking place, the whole surface must be slightly sprinkled and all the surplus grout on the tops of the brick swept into the joints to bring them up flush full. After sufficient time for evaporation and initial set one-half inch of sand should be spread over the whole surface, and if subjected to a hot summer sun this should be occasionally sprinkled for two or three days.

As undesirable variations from the above, the grout is sometimes dipped out with a bucket and carried some distance, the sand meantime settling to the bottom. When placed in and poured from a cradle or rocking box the sand similarly separates out during the rocking, and when poured out the richer mixture of cement flows ahead and the sand remains near the box. When wet up on the pavement or a mortar board by water from an open nozzle the cement is floated away from the sand. When placed on the street in too large quantities the grout separates, loses water by evaporation and absorption, and is in other ways ruined before it is finally swept into the joints. In applying the second or top course of grout a rubber or leather scraper is desirable, as this does not brush material out of the top of the joints but permits them to stand level full.

HASSAM PAVEMENTS

These were described by Claude A. Magill, General Manager of the Connecticut Hassam Paving Company. This pavement was designed by starting from the macadam road and noticing that the weak point of that was its binding material, which has little adhesive quality and cannot readily be retained in place. Cement seemed the most durable and effective substitute as a binding material. "It has been found that all of the usual methods of mixing concrete very imperfectly accomplished the requisite close incorporation of the cement and sand binder with the crushed stone, showing far too many and too large spaces in which the requisite percentage of stone was lacking, and where only binding material existed to stand the wear of traffic. Such spots in the pavement would wear more quickly than those in which the percentage of stone was greater, and as a consequence hollows would occur in the road surface, making it hummocky and rough." Laboratory investigations of ordinary concrete showed about 60 per cent. stone. Experiments showed that by selecting sizes of stone and thoroughly rolling, the interstices could be reduced to about 10 per cent., but practical difficulty was encountered in injecting the binding material after such rolling. "It has been demonstrated, however, that by laying the crushed stone dry and compressing with a roller, then adding a grout of cement and sand and again rolling thoroughly, it is very easy to obtain a concrete bed of which at least 70 or 80 per cent. is composed of the stone material," and that all air bubbles, such as are found in most concretes, are entirely squeezed out.

At first the Hassam pavement consisted of three layers; a foundation of egg-size stone about four inches deep, which was thoroughly rolled and grouted with one cement to four sand; over this two inches of chestnut size stone, rolled and grouted with one cement to two sand, and on this a wearing coat about one-half inch thick of one part of fine pea stones, one part of sand and one part of cement, which was evenly distributed and broomed into the previous layer. It was found difficult to place the surface coat before the bottom layer had taken its initial set, and a perfect union of the several layers was not always obtained.

These difficulties and defects having been learned by experience, it was determined to make all future pavements monolithic. To accomplish this, crushed stone passing a 2½-inch mesh and not passing a one-inch is distributed to a depth of six inches, thoroughly rolled and then grouted with a mixture of one cement and two sand, of the consistency of cream, and the whole then rolled again. This is the entire road, no special surface material being used. Whatever wear takes place results in maintaining the slight roughness of the surface which prevents it from becoming slippery.

At first, transverse expansion joints were placed every 150 to 200 feet, but it was found that the pavement at each such joint wore rapidly, and these joints are not now employed. The pavement is usually laid in summer, and in winter there may appear at intervals of 200 feet some slight cracking of the surface. Such cracks are very slight, however, and are purely superficial hair cracks; they close entirely with the return of warm weather and no injury appears to be occasioned by such cracks through the entrance of frost, chipping or in any other way. Where laid between curbs, however, longitudinal expansion joints should be provided, to permit removing or changing the curb.

It is claimed that there is considerable advantage in the use of this pavement along street railroad tracks, since the pavement entirely and closely fills all spaces about the rails, holding them solidly in position and thus preventing the pounding and wear of the rails at joints caused by the ordinary vibration, and also preventing the disintegration of the pavement along the rail which is generally caused by such motion.

IMPERIAL ROADS

Concerning these, W. B. Spencer, Vice-President of the Imperial Road Company, stated that they utilized the principle of resiliency in their construction, by which the effect of the load was distributed over a considerable portion of the surface; asphalt being itself resilient and losing none of this quality when combined with earth by their process. This road is "constructed with asphalt and asphaltic oils thoroughly and scientifically mixed with the dirt or old macadam of an existing road, as such material is found. The characteristics of Imperial are: First, that it is waterproof because of the abundance of asphalt in it, and thereby protects the foundation, eliminating the weakness of some of the older methods. Second, that it is dustless; although there is dirt in it, the asphalt and asphalt oils are mixed with the dirt to such an extent that they bind the loose particles close together. Third, it is noiseless; neither dirt nor asphalt possessing reverberating qualities. Fourth, it presents an ideal surface for automobiles or trucking; having a more or less gritty surface which absolutely precludes the possibility of skidding of automobiles and affords horses a firm foothold. The use of the road for five years in Kansas City, Mo., has, in our estimation, thoroughly substantiated these claims."

"In building Imperial roads we use the road dust as it lies, after being brought to grade. We first thor-

oughly pulverize it and then apply a mixture of asphalt and asphalt oils—the selection and proportions of which are carefully and actually determined in our laboratories. After the first application the material is re-pulverized and saturated a second time. The material is then turned over with turning plows and the process of two applications is repeated. At this stage the material is a soft, more or less spongy mass. While it is in this condition we apply a rolling tamper, which is constructed along original lines. This tamper, which weighs three tons, consists of a series of independent teeth, each with a surface of about eight square inches. Of course this tamper, the first time it is moved over the road, sinks for possibly six inches into the mixture of dirt and asphalt. This results in packing firmly for perhaps a quarter or one-half inch in depth, that portion of the material which happens to come beneath any of the teeth in the solid base below. The roller is hauled back and forth over the road until it has so thoroughly tamped the loose material that it rises to the top of it and leaves only small indentations on the road. This procedure is one of the strongest features of the process. It means the tamping from the bottom up of what becomes finally five to six inches of compact matter. We are frank in saying that we believe that unless this were done the road would not be successfully constructed.”

“After the tamper has served its purpose the road is brought to a permanent and smooth surface by means of an ordinary steam roller, followed by a thin application of sand or gravel and a small quantity of hot asphalt.”

The claim is also made that after being excavated for street trenching, the material thus prepared can be replaced in lumps as removed and thoroughly tamped into its permanent position, when it will be as good as new. The cost is said to be, generally speaking, about that of Telford macadam with a dust-proof surface. The pavement is said to require nothing for maintaining, any ruts which may be formed being ironed out by the traffic.

MINERAL RUBBER PAVEMENT

A paper describing this pavement was prepared by Linn White, Engineer of the Chicago South Park Commissioners, but in the absence of Mr. White was read by the Secretary. This pavement was described in the October 21 issue of the MUNICIPAL JOURNAL AND ENGINEER; Mr. White's paper, however, adds some information not given therein. The asphaltic cement used to give the rubbery qualities desired must, he states, be comparatively soft, with a rather low melting point and showing permanency under extremes of temperature. The specifications require that the cement shall be 99.5 per cent. pure bitumen, which bitumen shall contain from 73 per cent. to 76 per cent. petrolene, soluble in petroleic ether of 85° Baume, and from 24 per cent. to 25 per cent. asphaltene, soluble in chloroform and not soluble in petroleic ether. The melting point of the asphalt cement must be not less than 80° F. and not

more than 190° F. Using the Dow penetration machine, the asphaltic cement must not vary more than 5 mm. in penetration from the following standard:

42 mm. at 32° F., with 200 grams weight on No. 2 needle for 1 minute.

62 mm. at 77° F., with 100 grams weight on No. 2 needle for 5 seconds.

114 mm. at 115° F., with 50 grams weight on No. 2 needle for 5 seconds.

The asphaltic cement should have a specific gravity of 98.5 at 77° F. and weigh 8.2 pounds per gallon. When 20 grams of the asphaltic cement is heated in a dish $2\frac{1}{4}$ inches in diameter and $1\frac{5}{16}$ inches deep for 7 hours in an oven, the interior of which is maintained at a constant temperature of 325° F., it shall not lose in weight more than half of 1 per cent.

Special attention was called to the low melting point, stability in temperature changes and very small loss under the evaporation test, as these characteristics give the rubbery quality of the pavement and justify belief in its permanency. Without these the pavement would differ but little in composition from other asphaltic concretes. The method of laying the paving, however, is considered a large factor in making possible its moderate cost.

BLOME CONCRETE PAVEMENTS

THE Blome method of constructing concrete pavements* was described by H. S. Dewey, of the Rudolph S. Blome Company of New York. He assumed that the requirements of a modern pavement were a hard wearing surface sufficiently durable to withstand modern traffic, and proper provision for sanitation, together with the ordinary minor qualities. In the construction of this pavement the ground is first leveled and rolled to a true surface 11 inches below finished grade. On this is placed a foundation layer of coarse sand or cinders 4 inches thick, which is rolled to a true surface until thoroughly compacted. The pavement consists of $5\frac{1}{4}$ inches of concrete base and $1\frac{3}{4}$ inches of surface blocking, or a total of 7 inches. The stone used for the concrete is of such sizes that no stone measures more than $1\frac{1}{2}$ inches nor less than $\frac{1}{4}$ inch in any dimension. The $5\frac{1}{4}$ inch base is composed of one part Portland cement, three parts sand and four parts crushed stone. This is mixed by machine, being turned over at least six times before removal from the mixer. It is then thoroughly tamped in place and is given a uniform thickness of $5\frac{1}{4}$ inches at all points. It is laid with expansion joints, the transverse joints being not more than 75 feet apart and the longitudinal joints being continuous along the curb or gutter. These expansion joints extend through both the base and the surface and are filled with a bituminous or other jointing material.

After this base has been thoroughly compacted, and before it has begun to set, the surface concrete $1\frac{3}{4}$ inches thick is put into position. This contains one part Portland cement and $1\frac{1}{2}$ parts of clean crushed granite or trap rock. The crushed rock is thoroughly

screened so that all dust is removed and the following proportionate grading of sizes is obtained: 50 per cent. of what is known as $\frac{1}{4}$ inch size, 30 per cent. of $\frac{1}{8}$ inch size and 20 per cent. of 1-16 inch size. "This proportion of sizes is essential and must be kept absolutely accurate, as in this lies one of the essential requirements to produce proper results. This material is mixed with the cement thoroughly, and after being wetted to a proper consistency and deposited on the concrete is worked into rectangular brick shapes approximately $4\frac{1}{2}$ by 9 inches, similar to stone block paving. This is done by special methods, and utilizing grooving apparatus as employed under the Blome Company's patents."

The author claims that this paving is not noisy, retains its top level almost to the point of perfection, is almost perfectly sanitary, and prevents the skidding tendencies of rubber-tired vehicles under all weather conditions; that pavements laid in Michigan cities, where the thermometer frequently reaches 40 degrees below zero and in the summer reaches 90 degrees, three years have indicated no evidence of fracture or disintegration due to the weather. Pavements in Chicago have been laid in localities where the heaviest traffic conditions prevail and after five to twelve years of constant use show, he stated, comparatively slight traces of wear and little or no tendency to break or chip.

THE HAMPTON DOCTRINE OF SEWAGE PURIFICATION

BY F. E. LANE

At the annual summer meeting this year of the Association of Managers of Sewage Disposal Works, in England, Dr. W. Owen Travis presented a paper on the "Hampton Doctrine in Relation to Sewage Purification," from which the following abstract has been prepared.

Against the theory that purification of sewage in artificial treatment areas is entirely due to the activity of bacteria, by which the putrescible and similar constituents of sewage are converted into harmless matter, the Hampton doctrine teaches that the purification process is essentially a physical operation, being itself entirely an action of continuous dissolution. In other words, the suspended and insoluble impurities contained in sewage drop out of, or are, as solid or insoluble matters, absorbed from that liquid as effectually as if they had been entirely removed by a process of precipitation, to which the action is analogous. The doctrine thus denies that the purification process is, in any sense of the word or under any circumstances, the result of bacterial action.

The sewage, as it enters the disposal works, contains the gross, fine, and particulate suspended solids; the latter being those in colloidal solution, together with organic and inorganic solids in actual solution.

When the sewage is submitted to a tank operation, considering only its own molecular changes unaffected by outside causes and contributory influences, it is

changed by virtue of a physical operation. Gravity will cause it to leave behind its gross solids, these either rising or falling and carrying with them some proportion of the fine, and possibly some of the particulate solids. The liquid itself and the solids which it carries forward will undergo no appreciable biolytic change in their transit.

The physical action, therefore, constitutes the fundamental principle in every form of tank and must not be overlooked in considering the operations occurring in any of them. In ordinary sedimentation tanks it comprises the entire operation. In chemical precipitation and in hydrolytic tanks it is assisted by the coagulation of an additional amount of fine and particulate solids, which is induced by the chemicals added to the former and by the numerous surfaces placed in the latter. In septic tanks the physical operation is interfered with and the resulting effluent is very considerably modified by the biolytical action which is cultivated therein. This action takes place not in the flowing sewage, but in the sludge which has accumulated from previous sewages which have long since passed out of the treatment area. The effect of the septic action in inhibiting the physical operation and in fouling the effluent is dependent upon and proportionate to the amount of sludge accumulations.

When a tank effluent or crude sewage is discharged upon a filtration area the dissolution effect is rendered obvious, for the foul smelling, usually turbid and deeply opalescent liquid is, in passing through a few feet of the filter, changed into an almost transparent liquid, practically free from odor and deposit. The products of a volatile character are retained in a more or less insoluble and non-volatile state, as is illustrated by the deodorizing power of the soil in removing odors from decomposing organic matters.

Sewage or tank effluent is thus deprived of its foul impurities and characteristics. The liquid passes on practically pure, the solid matter and the other impure constituents of the liquid remaining behind fixed in the filtration area. Bacteria play practically no part in this separation or purification.

The effluent from the filtration area may, if the pores of this are sufficiently open, contain some suspended matter from the sewage, and it will certainly contain some proportion of the solids in colloidal solution which have not been deposited therefrom, as well as some organic products and ammonia which have not been absorbed. If this effluent is passed through another filtration area there is again a deposition and absorption of the impurities and a second biolysis of the stored matters, and laboratory analyses would show increasing transparency of the liquid.

In concluding, Dr. Travis contended that the Hampton doctrine has demonstrated a rational interpretation of practical sewage disposal operations and a faithful interpretation of "Nature's method" which, concisely stated, is to fix the impurities in the soil with the dual object of creating a larger, practically inexhaustible reserve for future fertilizing purposes and of protecting underground waters from contamination.

CEMENT SIDEWALKS

Best Materials and Methods of Construction—Faulty Methods Pointed Out—Foundation, Drainage, Mixing Cement—Requirements of Various Cities

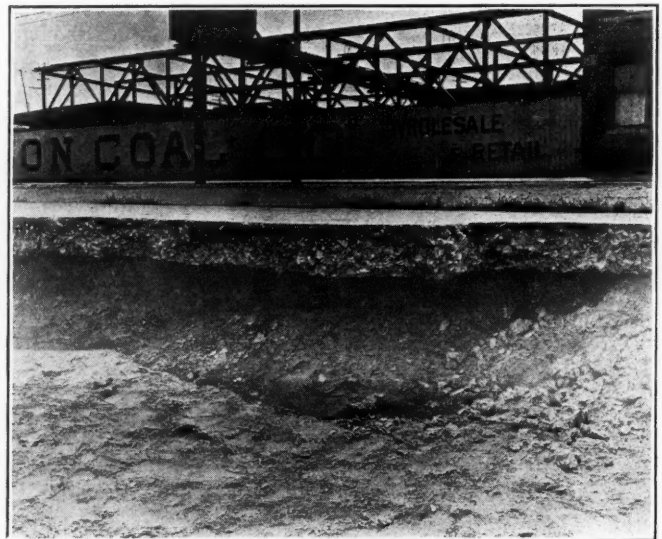
THERE is probably no one use of cement at the present time, certainly none in connection with municipal work, in which such large quantities of this material are used as in the construction of sidewalks. With large quantities being so used, it becomes a matter of great importance that the best methods of construction be employed. Many methods and forms of specifications have been prepared and published both in technical periodicals and in other ways. One of the best articles giving general information concerning the construction of cement sidewalks, and which is especially strong in pointing out more or less common errors which should be avoided, is published in pamphlet form by the Universal Portland Cement Company, the authorship being credited to C. W. Boynton. With the permission of the above company we present herewith some of the suggestions given in this pamphlet, especially those relative to causes of failure, with illustrations from the same source.

The quality of the work is just as dependent upon the sand, gravel and crushed stone as upon the cement, and mistakes in selecting material are much more likely to occur with the former. The stone is generally satisfactory if hard and durable and free from dirt. In selecting gravel more care is necessary. Shaley pebbles found in some Mississippi valley gravels are very objectionable. The sand used also should be hard and not decomposable by weather. Sand and gravel or broken stone should be combined in graded sizes so as to make a dense mixture. These and other conditions, however, hold for all concrete work which is exposed to weather or to wear.

One source of frequent failures is the foundation. This should furnish an absolutely solid support for the wearing surface and also provide perfect drainage. And this means not only that water can soak down through the foundation material, but also that provision is made for withdrawing it from under the sidewalk. In the case of non-permeable soils such as clay, artificial drainage should be provided. In some cases this is best effected

by placing stone filled trenches at intervals across the walk below the foundation and leading to a drainage system under the curb. In other cases a tile drain under the walk is necessary.

For the foundation material steam cinders are commonly employed; ashes also are used, but these are very objectionable since the fine ash prevents the motion and draining out of the water. Whatever material is employed should be sufficiently solid and coarse to leave ample drainage interstices after being rammed into a solid bed. Not only the foundation material but the soil under it should be so solid that no settling will ever take place. The result of poor foundation is shown by the crack in Fig. 1. Where the sub-foundation is artificial it should be thoroughly tamped and compacted; and it should be carried to a sufficient width to leave a berme extending beyond the sidewalk, so that caving under the sidewalk may not be caused by rain or otherwise, producing the condition shown in Fig. 2.

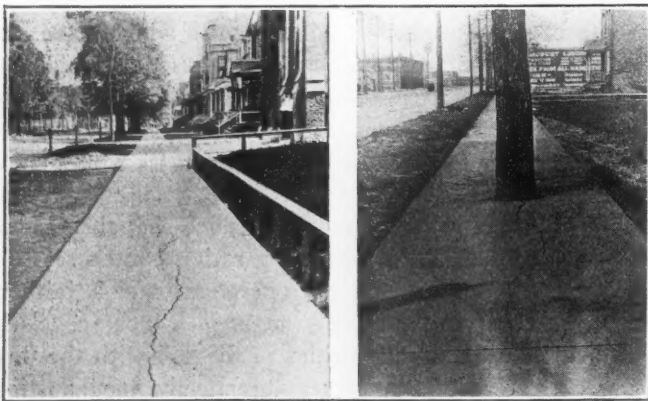


NO. 2—RESULT OF INSUFFICIENT FILL UNDER WALK

The surface of the walk should be given a pitch to carry off all rain water. The edge nearer the street should, for this purpose, be lower than the other, draining the water toward the gutter. Where the walk is through grounds or in similar localities a gutter is placed on each side and the pavement is made somewhat higher in the center than at the edges.

This pamphlet recommends expansion joints filled with paver's pitch or other suitable material, placed transversely every 50 feet. This is especially desirable where a sidewalk abuts directly against a curb. The effect of failure to provide for such expansion is shown in Fig. 3.

The sand and cement should be mixed dry and water applied only when the mixture has a uniform color throughout. A machine mixer of the batch type is recommended as being more certain and reliable than hand mixing. As much water should be added as will permit of thorough tamping. Excessive water should not be substituted for thorough mixing, however, as this tends to float the cement up to the surface leaving the lower portions of the mixture proportionately weak.



NO. 1—CRACK IN SIX-FOOT WALK, CAUSED BY POOR FOUNDATION

INSUFFICIENT CLEARANCE AROUND TREE

SPECIFICATIONS FOR CEMENT PAVEMENTS—TABULATION OF REQUIREMENTS IN VARIOUS CITIES

CITY	MINIMUM THICKNESS			Max. Rise Per Foot	Drain	PROPORTIONS		Foundation Kind	SIZE OF AGGREGATE		METHODS OF MIXING		Size of Blocks
	Sub-Base	Base	Top			Base 1 Cement to	Top 1 Cement to		Base	Top	Base	Top	
Augusta, Ga.	4"	3"	1"	1/4"	Not specified.	2 Sd.:4 S. or B.	1 Sd.	N. S.	Thru 1 1/2"	N. S.	No. 1	No. 1	4' square
Baltimore, Md.	4"	4"	1"	1/2"	Not specified.	3 Sd.:6 S.	1 Sd. or 1 Sd.:1 Scr.	Cs. or Substitute.	Thru 1 1/2"	Thru 1 1/2"	N. S.	N. S.	5' long
Boston, Mass.	12"	3"	1"	3/4"	Not specified.	2 Sd.:5 S.	1 Scr. or 1 Sd.	Cs. Gr. SCds.	1/2"-2 1/4"	Thru 1 1/2"	No. 1	N. S.	12 sq. ft. to 36 "
Buffalo, N. Y.	3"	3"	1 1/2"	1/2"	Not specified.	6 Gr.	2 Gr.	Cds. or S.	N. S.	Thru 1 1/2"	No. 2	No. 1	4' wide
Cedar Rapids, Ia.	5"	4"	*	1/4"	3" Tile in 1' x 1' Trench	3 Sd. and Gr.	N. S.	Cds. Gr. Cs. Sd.	Thru 1"	N. S.	No. 2	*	3':6' long
Chattanooga, Tenn.	2"	3"-4"	1"	1/4"	Not specified.	3 Sd.:6 S. or Gr.	1 1/2 Sd. or CG.	Cds. Sl or Gr.	Thru 1"	1" less 30% Dst.	No. 1	N. S.	25 sq. ft.
Chicago, Ill.	9"	4 1/2"	1"	1/4"	Not specified.	2 1/2 Sd.:5 S. or Gr.	1 1/2 Sd. or Scr.	Cds.	1/2"-1" Spl.	Thru 1 1/2"	No. 1	N. S.	5' x 6' Abt.
Cincinnati, O.	8"	3"	1"	3/4"	3" Tile where Eng. directs	2 Sd.:5 P. or Bp. or Bld.	1 1/2 Sd.	SCds.	1/2"-1"	No. 4 Screen.	No. 1	No. 1	4':6' long
Cleveland, O.	6"	3"	1 1/2"	N. S.	Not specified.	6 Gr. or 3 Sd.:6 Sd. or S.	2 Sd.	Cs. Sl. Cds. or Gr.	1 1/2"	Special.	No. 1	No. 1	5' x 6'
Columbus, O.	8"	3"	1"	3/4"	3" Tile where Eng. directs	2 Sd.:4 Cs. or Gr.	1 1/2 GScr. or 1 Sd.:1/2 Torp.	SCds. or Sl.	1/2"-1 1/2"	No. 4 & Spl.	No. 1	No. 2	4':6' long
Grand Rapids, Mich.	N. S.	3 1/2"	1"	1/4"	Not specified.	4 Sd.:8 Gr.	2 Sd.	N. S.	1/2"-2 1/2"	Thru 1 1/2"	No. 2	No. 1	6' wide
Kansas City, Mo.	6"	3 1/2"	1"	1/4"	Not specified.	2 Sd.:4 Cs., 1 Sd.:4 J. P. or Gr.	1 1/2 Sd.	Cds.	No. 16-1/2"	Thru No. 8	No. 2	N. S.	6' long
Lincoln, Neb.	3"	3"	1"	N. S.	Not specified.	4 Gr. + Sd. to fill, or 3 Sd.:4 S.	1 1/2 Sd.:2 Scr.	Cs. or Cds. or B.	S. 1 1/2" Gr. 1/2"-1"	Thru 1 1/2"	N. S.	N. S.	N. S.
Little Rock, Ark.	N. S.	3 1/2"	1"	N. S.	Not specified.	2 Sd. or Scr.:4 Cs. or Gr.	1 1/2 Sd. or Scr.	N. S.	N. S.	N. S.	N. S.	N. S.	6' one way 25 sq. ft.
Los Angeles, Cal.	6" 2"	3"	1"	N. S.	Not specified.	3 Sd. or Scr.:5 Gr. or S.	1 1/2 Sd.	Gr.	Gr. 1/2"-3" or Cs. 1/2"-2"	Scr. thru 1"	No. 2	No. 1	N. S.
Minneapolis, Minn.	1"	2 1/2"	1"	N. S.	Not specified.	4 Sd.	2 Sd.	Sd.	Sd.	N. S.	No. 2	No. 1	N. S.
New Orleans, La.	N. S.	4"	1"	N. S.	Not specified.	3 Sd. + S. so mortar overfills 20%	1 Sd.	N. S.	Thru 2"	Special.	No. 3	N. S.	N. S.
N. Y.—Brooklyn.	7"	4"	1"	N. S.	Not specified.	3 Sd.:6 S.	1 1/2 Scr.	Cds.	1/2"-1 1/2"	Thru 1 1/2"	No. 1	No. 1	4:6 ft. sq.
N. Y.—Manhattan.	7"	4"	1"	N. S.	Not specified.	2 Sd.:4 S.	1 1/2 Scr.	Cds.	1/2"-1 1/2"	Thru 1 1/2"	N. S.	No. 1	4:6 ft. sq.
Philadelphia, Pa.	14"	3"	1 1/2"	N. S.	Not specified.	3 Sd. or Gr.:6 S.	1 Scr.	HCds.	1/2"-2"	Thru 3/4"	No. 1	N. S.	6' square
Pittsburg, Pa.	6"	3"	1"	1"	12" x 10" S. 25' c to c.	3 Sd.:6 Cs. or Gr.	2 Scr.	Cs. or Cds. 1"-3"	1/2"-1 1/2"	S thru 1"	No. 1	No. 1	N. S.
Portland, Ore.	N. S.	3"	1"	N. S.	Not specified.	3 Sd.:5 or 6 Cs. or Gr.	1 Sd.	N. S.	1/2"-2"	N. S.	No. 1	N. S.	3' square
Rochester, N. Y.	6"	N. S.	1"	3/4"	Not specified.	2 Sd.:4 Cs. or Gr.	1 1/2 Sd. or Scr.	Gr. Cs. SCds. Thru 2"	Thru 1 1/2"	Thru 1 1/2"	No. 1	N. S.	4' long
San Francisco, Cal.	N. S.	3"	1"	N. S.	Not specified.	4 1/2 Gr. or Cs. + Sd. to fill voids.	1 Gr.	N. S.	1/2"-1 1/2"	N. S.	No. 1	No. 1	3' square
Seattle, Wash.	N. S.	3 1/2"	1"	N. S.	Dr'n tile w're Eng. directs	3 Sd.:6 Gr. or Cs.	1 Sd.	N. S.	1/2"-1 1/2"	N. S.	No. 1	No. 1	2' square
South Bend, Ind.	N. S.	3 1/2"	1"	1"	Not specified.	2 Sd. or Scr. + S. so mortar overfills 2 p'rts	1 Sd.	N. S.	Thru 1"	N. S.	No. 1	No. 1	N. S.
Springfield, Ill.	4"	4"	1"	1"	Not specified.	3 Sd. + S. so mortar overfills voids.	1 Scr.	Cds.	Millrun.	N. S.	No. 1	N. S.	N. S.
Springfield, O.	8"	3"	1"	N. S.	Not specified.	5 Gr.	1 1/2 Sd.	Gr.	N. S.	N. S.	No. 2	No. 1	5' x 6'
Superior, Wis.	8"	3"	1"	N. S.	See Specific.	3 Sd.:5 S.	1 Sd. or Scr.	Gr. Cds. Cs.	S 1" Gr. 1 1/2"	N. S.	N. S.	No. 1	Special
Stewart, J. A., Cincinnati.	8"	3"	1"	N. S.	3" Tile in 4' x 6" trench	2 Sd.:4 Gr.	2 Sd.	Cds.	1/2"-1"	Thru No. 4	No. 1	No. 1	N. S.
St. Louis, Mo.	8"	3 1/2"	1"	N. S.	Not specified.	3 CG.	1 Scr.	Cds. Thru 2"	Thru 3/4"	N. S.	No. 2	N. S.	N. S.
St. Paul, Minn.	4" S. 6" Cds.	3"	1"	N. S.	Not specified.	3 Sd.:5 S.	1 1/2 Sd.	Cs. or B. SCds.	1/2"-1 1/2"	N. S.	No. 1	No. 1	4':6'
Syracuse, N. Y.	N. S.	3"	1"	N. S.	Not specified.	3 Sd.:6 S. or Gr.	1 1/2 Sd.	Gr. Cds. Cs.	1/2"-1"	Thru 1 1/2"	No. 1	No. 1	5' x 5'
Toledo, O.	6" Gr. 8" Cds.	3"	1"	3/4"	Not specified.	3 Sd.:5 S. or Gr.	2 Sd. or Scr.	Gr. Scr. Cds.	Thru 1"	N. S.	No. 1	No. 1	N. S.
U. S. A. Ft. Sheridan	10"	4"	1"	N. S.	Not specified.	2 Sd.:4 S.	1 1/2 Sd.	5" Cds. or Scr. & 5" Cs. thru 2"	Thru 3/4"	Special.	N. S.	N. S.	6' long
Youngstown, O.	4"	3"	1"	1"	Not specified.	6 Sd.:Gr. or S. so mortar overfills v'ds.	2 Sd.	Mill ash or Sl.	Thru 1"	N. S.	N. S.	No. 1	4':5' long

*Mortar for top flush from rich base by tamping.

†Engineer for number of villages near Cincinnati.

‡2" on "adobe" soil.

METHODS OF MIXING

BASE

No. 1—Cement and Sand dry, then wet. Incorporate stone (wetted) with mortar.

No. 2—All materials dry, then wet.

No. 3—Cement and Sand dry. Wet stone added and mixed.

TOP

No. 1 Cement and Sand or screenings dry.

Cement and Sand or screenings wet.

Cement and Sand or screenings dry.

No. 2 Cement and Sand or screenings thru No. 4 sieve.

Cement and Sand or screenings wet.

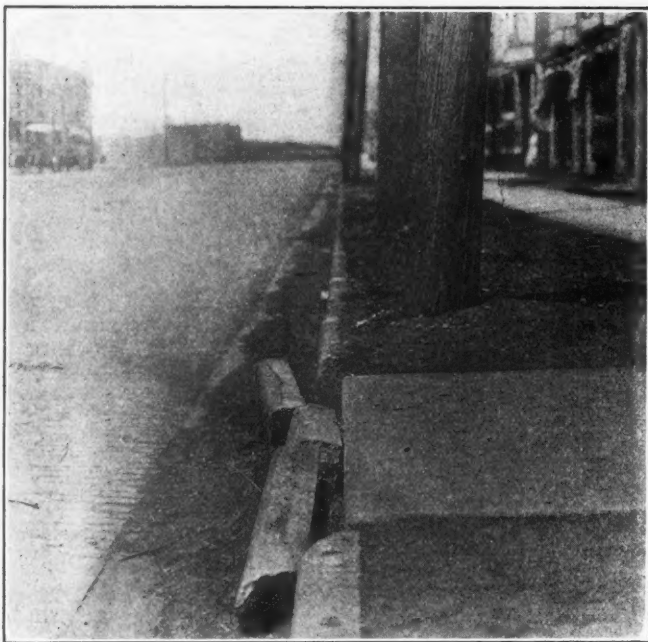
Number in lower right-hand corner means number of turns wet.

ABBREVIATIONS

Broken Boulders.....=Bld.
 " Brick.....=B.
 " Pebbles.....=Bp.
 Cinders.....=Cds.
 Crushed Granite.....=CG.
 " Stone.....=Cs.
 Dust.....=Dst.
 Gravel.....=Gr.
 Granite.....=G.
 Granite Screenings.....=GScr.

Hard Coal Cinders.....=HCds.
 Joplin Flint.....=J. F.
 Not specified.....=N. S.
 Pebbles.....=P.
 Stone.....=S.
 Soft Coal Cinders.....=SCds.
 Screenings.....=Scr.
 Sand.....=Sd.
 Slag.....=Sl.
 Torpedo Sand.....=Torp.

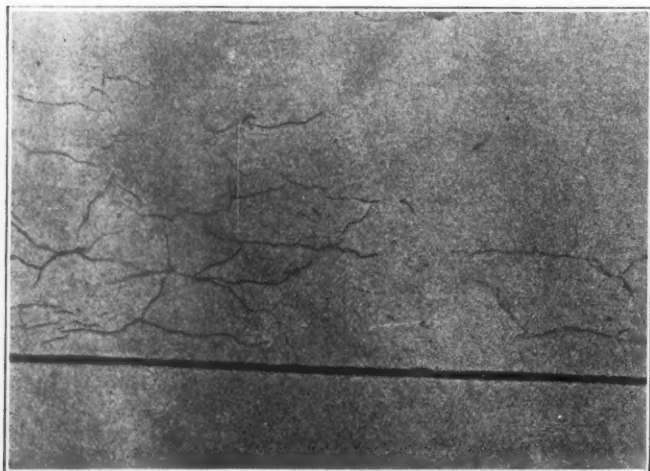
Number in lower left-hand corner means number of turns dry.



NO. 3—CURB BROKEN BY EXPANSION OF WALK

Under no circumstances should concrete which has perceptibly hardened be re-mixed and used. Even if mixed with new concrete it simply weakens the whole batch by a surplus of inert material. One effect of using retempered concrete is shown in Fig. 4.

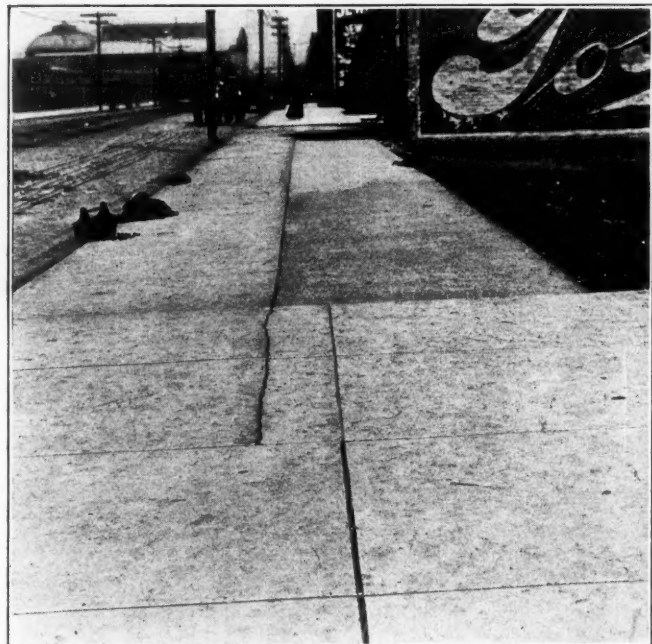
The concrete should be deposited within forms on a sub-base previously wet and tamped into final position as quickly as possible. On hot, dry days it should be placed immediately, even though this necessitates mixing in smaller batches. The forms should be filled to the top with concrete and then tamped until at least 3-4 of an inch lower; this will permit of a 3-4-inch top, and at least this thickness should be obtained throughout the walk. To ascertain this, a straight edge should be employed which is so notched out that, when placed on the top of the forms, the edge shall be 3-4 of an inch lower. This straight edge can then be drawn along the forms and should clear all parts of the concrete. The base should be constructed in blocks which have no bond with each other; this being effected by constructing alternate blocks and afterward filling the spaces between, or by



NO. 4—INCIPIENT CRACKS, CAUSED BY USING RETEMPERED CONCRETE, OR ALLOWING IT TO STAND TOO LONG BEFORE RAMMING

inserting metal cross-forms which are withdrawn when the surface material is being placed. Many a walk otherwise good has gone to pieces because constructed as a monolith over a large area. The practice of depending upon being able to cut through both top and base after construction is *bad*, and should never be permitted. An additional advantage of the use of metal cross-forms is that the spaces left by their withdrawal provide expansion joints.

Fractional slabs, to be completed on the following day, should never be constructed at the end of a day's work, or even left at the noon hour, as a crack is almost sure to form at the juncture. Care should be taken to so locate dividing joints as to give a symmetrical appearance and to avoid corners and unnecessary angles. Joints in new work abutting old should line in with the joints of the old, or else a distinct open joint should separate the two. Besides the objectionable appearance,



NO. 5—RESULT OF NOT ALIGNING NEW JOINTS WITH OLD

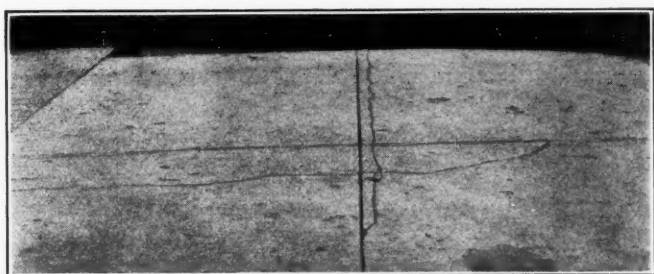
an injurious effect, such as is shown in Fig. 5, is apt to occur.

The top surface should be smooth but not slippery; a gritty, coarse surface is preferable to a smooth, glossy one, being less dangerous in winter or wet weather and less glaring in sunlight. This top surface may be floated on; *i. e.*, applied very thin and troweled down; a better plan is to apply a stiff mortar, tamp it till the water floats on top, then finish the top as in floating. Top surfaces which loosen from the base are altogether too common. This defect may be caused by the drying out of the base before the top is applied. Sand or dirt spilled or tracked onto the base is another cause. Both should be absolutely prevented. But if for some reason it is necessary to place a top coat on a hardened base, the following plan is generally successful. Drench with water and thoroughly cleanse the top of the old concrete, removing all loose and foreign matter, and then apply a thin grout or wash of neat cement and water, which should, if possible, be brushed into the concrete by

vigorous scrubbing with a stiff fiber brush. The top is immediately after placed in the usual way.

Smooth, steel trowel finishing is probably the most common and the poorest finish used. It frequently results in "crazing," or hair checking, and the surface is objectionably smooth and shows every variation in color. Roughing by use of toothed rollers has little to recommend it. A brush finish or, perhaps better, wooden trowel finish is much to be preferred.

The jointing, or blocking out, of the top should coincide exactly with that of the base below. To designate the location of surface joints, the positions of the transverse joints of the base are marked on the upper edges of the forms. Failure to make the surface joints coincide with those in the base results in cracks as shown in Fig. 6.



NO. 6—SURFACE JOINT NOT OVER BASE JOINT

Whenever a walk is laid around a tree, provision should be made for its growth by leaving a clearance. This should never be less than 6 inches, and more is necessary for young trees. The result of failure to do this is shown in Fig. 1.

ASPHALT PAVEMENT REPAIRING

THE city of Milwaukee, Wis., has more than twenty-two miles of asphalt paved streets, much of which is being maintained by the city directly. To facilitate the repairing the city recently purchased a portable asphalt machine of a size adapted to such work. With this machine the cost of repairs is from 80 cents to \$1 per square yard, this including taking up the old material, the labor and the new material.

In operating the machine 1,000 pounds of old asphalt pavement is weighed upon the scales and to this is added from 31 to 35 pounds of B. 200 Hydrolin asphaltic cement, the exact amount depending upon the condition of the old asphalt material. This mixture is placed in the revolving drum of the machine, which is heated by a fire underneath and driven by a gas engine, and cooked for 15 to 20 minutes, at the end of which time a mastic has been formed. The hot mixture is then wheeled in steel barrows to the point where needed, where it is dumped, leveled off with rakes and ironed out with hot irons. Being at a higher temperature than is usual when the material is brought from a distance, the new material softens the edge of the old and makes a good bond. After this has cooled somewhat it is covered with cement and rolled with a hand roller. In the absence of sufficient old material, the customary mixture of new materials is employed. Commissioner Sherer informed our representative that the officials are highly

pleased with the character of the work being done by this plant but regretted that they had not secured a larger machine and might find it necessary to purchase another.

The machine used is a Guelich portable asphalt machine of the smallest size made and has developed a capacity of 45 to 50 square yards per day. An advantage claimed for this machine is that it uses the old asphalt and uses it on the spot without necessitating its double hauling to and from a stationary plant. Also that the use of this material ready mixed permits a considerable reduction in the operating force. Another advantage connected with a portable plant is that the material can, without being over-heated at the plant, be delivered upon the street at the highest desirable temperature. The mixing drum is cylindrical, supplied inside with mixing blades which revolve upon the axis in a gyratory way. Vertical bins for drying sand or stone are arranged inside the sheet iron housing which encloses the drum, and the sand and stone are dried and heated by the fire which heats the drum and which is placed directly beneath it. The plant is moved by a horse or a traction engine, its weight being about 6,000 pounds.



ASPHALT REPAIR PLANT IN MILWAUKEE

ASPHALTING ON OLD MACADAM

Use of Old Pavement as a Foundation—Reinforced with Additional Stone having Limestone Binder—Methods Employed in Chicago

THE population of the outlying sections of most cities is continually increasing and the nature and amount of traffic changing, and these conditions ordinarily call for a gradual change from macadam, which is ordinarily the first paving, to some more durable and satisfactory one. For a number of years such changes in Chicago have been made, in many cases, by placing asphalt on the top of the old macadam. This plan possesses the advantage of economy. It is especially applicable to streets where the grade can be raised slightly.

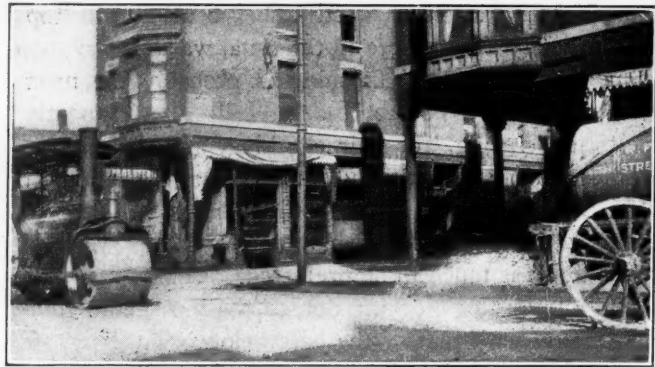
The method of performing this work in Chicago is as follows: On top of the old macadam is placed a layer of crushed limestone averaging about four inches thick, these stones being of the regular macadam sizes from two inches down. These are raked to a rough grade, a two-man rake being used for this purpose,



TWO-MAN RAKE

and are then covered with limestone screenings, limestone being used because, by taking advantage of the cementitious properties of this stone when in contact with water, a foundation nearly as solid as concrete is obtained. These fine screenings ultimately work all through the interstices of the larger stone down to the bottom. Just enough screenings are used to fill the voids, and none are left on top of the finished foundation. After the screenings have been thoroughly spread the entire street is drenched with water, either with a hose or sprinkling cart. A twelve-ton roller is used to perfectly compact the mass, and runs back and forth immediately after the drenching, which is continued until water rises to the surface, thus indicating the thorough compacting of the material. Spots where there have not been enough screenings are re-treated. This foundation is allowed to stand for a day or two to dry out, after which it is in a firm, hard condition, and shows no marks from a heavily loaded wagon driven over it.

After the foundation has been thus prepared an asphalt surface is constructed on it in the usual way, with a 1½-inch binder and a 2-inch wearing surface.



ROLLING AND SPRINKLING FOUNDATION

In some cases where the grade of the street is too high, the old macadam is taken out, the sub-grade lowered and the street rebuilt. In such cases, and for new work, eight inches of crushed stone is used and compacted in the way described above.

It has been found in Chicago that macadam foundation is especially satisfactory on sandy or gravelly soil, where the natural drainage is good, but on clay soil it seems best to use the ordinary concrete foundation, or else provide thorough under drainage. On the sandy soil of the south side of Chicago a number of asphalt pavements with macadam foundations have been down several years and so far have worn well and given no trouble.

It is estimated that asphalt pavements on an entirely new macadam base costs from 30 cents to 50 cents per square yard less than on concrete. The cost of a recent piece of asphalt paving constructed on old macadam as described above was \$1.52 per square yard; while an asphalt pavement on a concrete base laid on an intersecting street cost \$2.12.

UNNECESSARY CATCH-BASINS

THE Bureau of Sewers of Chicago, Ill., reports that, on account of increased appropriation during 1907, they were able to clean and repair the sewers systematically, and by the end of the year had the mains and catch-basins in fairly good condition. At the end of the year there were 66,976 catch-basins, which was about 3,000 more than at the beginning of the year. The total number of catch-basins cleaned once was 24,974; that is, one-third of the basins were cleaned once, or, what is more probable, say one-ninth of them were cleaned an average of three times each. If this latter assumption is true, then the other eight-ninths, or practically 60,000 catch-basins, are of no use whatever, either because they do not receive any dirt to retain, or because, not being cleaned, they remain full, and can receive none from future storms. The cost of these, over and above that of plain inlets, was probably about \$1,250,000, which amount would therefore seem to have been wasted.

Baltimore is constructing no catch-basins in connection with her sewerage system. While this is perhaps going too far to the other extreme, we believe that in a comparatively flat city, with well-paved streets, it is nearer correct practice than is Chicago's.

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NOVEMBER 4, 1908

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Unbusinesslike Municipal Methods

In referring to the result of its investigation into the finances of New York City, the Bureau of Municipal Research makes the following statement: "The city is a cash customer and buys in larger quantities than private customers; it should be able to obtain the benefit

of wholesale prices with cash and trade discounts. But on account of the way that it makes its purchases and settles its accounts it usually pays higher prices than any one else, frequently receives inferior goods and short deliveries, and fails to get either trade discounts or cash discounts. Here alone is a chance to save millions of dollars." These statements were backed up by facts and figures taken from the city's books. They describe only one of the many undesirable results from the unbusinesslike way in which a large number of our cities conduct their business. In our correspondence column will be found a letter from a city engineer, which points out another way in which many cities fail to effect possible economies; in this case failure to pay cash on contract work being the cause of increased charges therefor. Thieving city officials are fortunately very few; but the losses to taxpayers, due to unbusinesslike methods, exceed many times over those due to actual dishonesty.

Government Tests of Clay

THE United States Geological Survey is to begin at once investigation and tests of clays and clay products in this country, and it is expected that the results which they will obtain and publish will be of great benefit in improving the quality of such materials as sewer pipe, paving and sewer brick, fireproofing materials, and many other clay products which form a more or less important part of many classes of engineering structures. Such an investigation, they believe, is becoming more necessary on account of the increasing use of clay which is due partly to the scarcity of timber and to the increasing prevalence of fireproof construction. It is hoped also that it will result in the possibility of using clays which now seem unavailable for such purposes. An indication of the growth of the clay industry is given by the statement that in 1907 the value of its output was \$149,697,000, which was an increase of 14 per cent. over the previous year.

The ceramic section, of which Mr. A. V. Bleininger is the chemist in charge, hopes to unify methods of testing and to evolve standard tests of clays for the purpose of determining the use to which they are best suited, thus avoiding ill-advised investments in low grade clays. Such familiar properties as plasticity of clay are not fully understood nor are the nature of kaolins and paving brick shales. The differentiating between shales suitable for paving brick and those unsuitable will be an important study. Investigation also will be made of the proper heat treatment of paving brick clays, the drying of tender clays, burning in continuous kilns, reduction of heat losses in burning, adaptation of kilns to the use of low-grade fuels, etc. It is intended to study the relation between the true crushing strength of commercial bricks and their porosity, to establish a technical definition of a good building brick. Also the bearing of the process of manufacture upon these qualities.

MUNICIPAL BOND SALES DURING SEPTEMBER

NAME OF CITY	Estimated Population	ACTUAL VALUE OF ASSESSABLE PROPERTY (estimated)		Ratio of ass'd to act'l value	Bonded Debt	Sinking Fund	NET BONDED DEBT		Tax Rate Per \$1,000 Ass'd Value	BOND SALES, SEPTEMBER, 1908				Basis
		Total	Capita				Total	Per Capita		Term of Years	Amount	Interest	Price	
Abbeville, Ala.	1,140	\$750,000	\$657	66 2/3%	\$32,000		\$32,000	28.00					Par	.....
Gadsden, Ala.	10,000	6,086,522	608	50%	170,000		170,000	17.00	\$7.50	30	\$12,000	5%	Par	.....
Gridley, Cal.										1-33 ser.	100,000	5%	100.045	4.996
Santa Barbara, Cal.	12,000	8,562,152	713	60%	484,681	\$11,409	473,272	39.00	14.80	1-40 ser.	40,000	4 1/2%	100.352	4.473
Holly, Col.	1,200	750,000	625	16 2/3%	30,000		30,000	25.00	10.00	10-15 op.	40,000	6%	93.00	6.49
Manchester, Conn.										1-23	115,000	4%	Par	.....
New Britain, Conn.	43,000	36,000,000	318	75%	2,305,000	170,000	2,135,000	49.00	16.50	27 1/2	70,000	4 1/2%	Par	.....
Wilmington, Del.	90,000	55,000,000	611	80%	2,956,850		2,956,850	32.85	15.00	15	100,000	4%	99.577	4.038
St. Petersburg, Fla.										20-30 opt.	12,000	6%	102.916	5.757
Fitzgerald, Ga.	8,000	4,000,000	500	85%	71,000		71,000	8.00	11.50	30	130,000	5%	101.631	4.895
Ocala, Ga.										15-29 ser.	15,000	5%	100.04	4.997
Emmett, Ida.	2,500	106,400	42	25%					10.00	10-20 op.	25,000	6%	103.00	5.60
Whiting, Ind.	7,420	24,000,000	3,234	33 1/3%	21,000		21,000	2.00	1.10	12 1/2-25 op.-avg.	75,000	5%	103.34	4.644
Hospers, Ia.										20	7,000	6%	102.857	5.762
Humboldt, Ia.										5-10 op.	5,000	4 1/2%	100.20	4.454
West Point, Ia.										12 1/2 avg.	3,900	5%	Par	.....
Cottonwood, Kan.										20	25,000	4 1/2%	Par	.....
Dayton, Ky.	7,600	3,333,000	438	66 2/3%	154,000	6,277	147,723	19.00	14.50	7 1/2-20 op.-avg.	28,000	4%	100.017	3.997
Laurel, Md.										40	15,000	5%	104.61	4.742
Beverly, Mass.	18,000	29,576,175	643		1,966,250	712,458	1,253,792	69.00	17.40	1-10 ser.	50,000	4%	101.742	3.647
Brockton, Mass.	55,000	45,540,300	809	85%	3,140,250	577,644	2,562,606	46.00	20.90	5-29 ser.	50,000	4%	103.667	3.707
Concord, Mass.	5,600	6,126,187	1,093	100%	231,000	40,021.97	191,978.03	34.00	14.60	20	60,000	4%	105.341	3.622
Everett, Mass.	31,944	24,950,350	781	100%	840,000	310,832	529,168	16.00	18.50	1-10 ser.	40,000	4%	100.623	3.872
Lincoln, Mass.										10 1/2 avg.	52,000	4%	101.81	3.784
Medford, Mass.	21,500	21,756,800	1,013	100%	1,185,000	827,199	357,801	16.00	20.20	20	20,000	4%	104.815	3.658
Newton, Mass.	38,919	67,743,335	1,742		5,774,200	2,108,784	3,665,416	94.00	16.40	1-27 ser.	27,000	4%	103.887	3.643
Norwood, Mass.										1-40 ser.	40,000	4%	104.17	3.707
Big Rapids, Mich.	5,200	2,091,399	402	45%	89,017	1,259	87,758	16.00	15.51	15	15,000	5%	103.286	4.692
Lansing, Mich.	30,000	13,000,000	433		200,000		200,000	6.67	10.00	1-5 ser.	5,017	5%	102.33	
Breckenridge, Minn.	2,000	1,789,920	895	30%	35,778	942.18	34,835.82	17.42	53.80	5	12,000	5% a.	101.07	4.614
Trout Lake, Minn.										4-19 ser.	15,921	6%	Par	.....
Brookhaven, Miss.										20	8,000	6%	Par	.....
Inka, Miss.										20	15,000	5%	101.03	.....
Lucedale, Miss.	1,000	425,000	425	60%	10,000		10,000	10.00	11.50	20	17,500	6%	Par	.....
Fulton, Mo.	5,500	4,000,000	727	33 1/3%	50,000	4,000	46,000	8.00	9.50	5-20 op.	10,000	6%	100.25	5.979
Franklin, N. H.										20	3,000	5%	100.50	5.418
Point Pleasant, N. J.										20	50,000	3 1/2%	98.149	3.731
Woodbury, N. J.										30	1,000	5%	101.75	.....
Canajoharie, N. Y.										30	23,000	5%	Par	.....
Mt. Vernon, N. Y.	30,000	35,560,000	1,185	80%	2,278,300	613	2,277,687	75.92	20.70	30	85,000	4 1/2%	101.00	4.439
Peekskill, N. Y.										1-7 ser.	3,500	4.20%	Par	.....
Saranac Lake, N. Y.										6	40,000	5%	103.975	4.242
Troy, N. Y.	76,000	55,986,974	736	100%	3,956,606	148,355	3,808,251	50.00	16.90	23 1/2 avg.	60,000	4.15%	100.074	4.145
Yonkers, N. Y.	68,000	60,019,750	883		5,018,682	299,600	4,719,082	69.40	24.48	30	38,000	4%	100.11	4.492
Shelby, N. C.	4,000	1,231,283	307	60%	150,000		150,000	37.00	13.50	150,000 5% s.a.	150,000	5%	100.286	.....
Canton, O.	45,000	60,000,000	1,333	25%	306,000		306,000	6.08	32.00	1-20 ser.	16,000	4 1/2%	103.416	4.097
Dayton, O.										5	1,400	5%	103.817	4.055
Greenville, O.	7,850	6,500,000	828	50%	148,000	30,000	118,000	15.03	2.90	5	2,100	5%	103.021	4.322
Malta, O.										3 1/2 avg.	8,000	4 1/2%	100.675	4.28
Marion, O.	20,000	10,663,500	533	66%	509,013		509,013	25.00		5	5,600	4 1/2%	101.409	4.14
New London, O.	1,500	1,800,000	1,200	30%	19,000	2,125	16,875	11.00	15.00	10	2,000	4 1/2%	102.25	4.00
Norwood, O.	15,000	8,515,270	567	60%	880,672	65,819	814,853	54.00	13.84	1-10 ser.	15,000	4 1/2%	103.90	4.022
Oakley, O.										1-10 ser.	70,000	5%	104.00	3.998
Oberlin, O.										2-6 ser.	2,500	4%	101.00	3.73
Salem, O.	11,000	7,000,000	636	40%	318,000		318,000	28.00	35.60	1-5 ser.	500	5%	102.50	4.106
Scio, O.										16-18 ser.	1,500	5%	110.53	4.131
Shawnee, O.										4 1/2 avg.	29,980	4%	Par	.....
Shelby, O.	5,550	3,000,000	540	58%	182,000		182,000	32.00		9 1/2 avg.	5,935	4%	100.26	.....
Springfield, O.	48,000	35,000,000	729	20%	1,014,827		1,014,827	21.14	27.30	1-10 ser.	17,000	5%	103.703	4.238
Steubenville, O.										7-16 ser.	5,000	5%	109.11	4.004
Wapakoneta, O.										1-5 ser.	1,119	4 1/2%	100.49	4.325
Wellsville, O.										1-10 ser.	1,808	4 1/2%	102.00	4.09
Youngstown, O.	60,483	56,882,000	940	50%	1,269,112	209,167	1,059,945	17.25	29.42	25	8,600	4 1/2%	103.32	3.97
Baker City, Ore.										5 1/2 avg.	1,946	5%	104.059	4.166
Alliance, Pa.										5 1/2 avg.	5,883	5%	104.017	4.174
Boswell, Pa.	1,800	681,900	378	60%	1,300	1,000		300	16	20	750	4 1/2%	105.60	4.087
Leechburg, Pa.										1-10 ser.	11,000	4 1/2%	102.069	4.107
Midland, Pa.										3 1/2 avg.	15,040	5%	101.934	4.352
Platte, S. D.										1-20 ser.	25,000	4 1/2%	103.52	4.084
Houston, Tex.	85,000	150,000,000	1,764	33 1/3%	3,919,000	62,000	2,857,000	33.00	18.00	17 1/2 avg.	25,000	4 1/2%	103.69	4.197
Ogden, Utah					20,000	20,000				3 1/2-12 1/2 ser.	8,770	4%	Par	.....
Philippi, W. Va.	1,500	1,500,000	1,000	0 8 %						9 1/2 avg.	2,893	4%	Par	.....
Salem, W. Va.										22 1/2 avg.	15,000	5%	101.61	4.879
Welch, W. Va.										1-5 ser.	7,274	5%	101.271	4.519
Wellsburg, W. Va.										5 1/2 avg.	30,000	4 1/2%	102.255	4.039
Cedarsburg, Wis.	29,000	\$25,000,000	\$924	80%	\$800,000	\$37,000	\$763,000	26.00	\$14.00	6 1/2 avg.	9,000	4 1/2%	101.722	4.194
Madison, Wis.	10,000	\$ 000,000	500	70%	40,000		40,000	4.00	27.00	1-20 ser.	10,000	4 1/2%	103.05	4.139
Merrill, Wis.	6,048	500,000	82	80%	187,000	57,000	130,000	21.00	25.50	2-11 ser.	14,000	4 1/2%	102.107	4.126
Rock Springs, Wyo.										20	8,200	5%	110.103	4.245
										4 avg.	4,860	5%	104.82	3.692
										4 avg.	2,540	5%	102.76	4.243
										2-6 ser.	2,300	5%	102.42	4.335
										2-6 ser.	965	5%	102.04	4.437
										2-6 ser.	3,335	5%	102.42	4.335
										2	575	5%	102.04	4.437
										2	1,360	5%	102.15	4.394
										2-6 ser.	25,800	5%	103.10	4.151
										1-10 op.	3,955	6%	101.00	5.787
										5-10 op.	20,000	4%	100.25	3.944
										2-15 ser.	7,000	6%	102.857	5.575
										7 1/2-12 1/2 op.-avg.	10,000	5%	101.013	4.837
										12 avg.	30,000	5%	Par	.....
										20	16,000	5%	106.01	4.539
										20-30 op.	100,000	5%	95.81	4.314
										5-20 op.	75,000	4%	106.10	5.21
										10-15 op.	6,000	6%	106.317	5.501
										10-34 ser.	\$31,500	6%	101.19	5.844
										10-30 op.	21,000	6%	101.238	4.842
										10-34 op.	36,000	5%	101.41	4.344
										8 1/2 avg.	15,000	4 1/2%	99.29	4.052
										20	55,000	4%	102.30	4.286
										10-19 ser.	50,000	4 1/2%	103.15	5.164
										5-19 ser.	15,000	4 1/2%	102.84	5.622
										10-20 op.	40,000	6%		

NEWS OF THE MUNICIPALITIES

Divers Subjects of General Interest and Their Treatment by City Councils and Officials—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

ROADS AND PAVEMENTS

Impracticable Specifications on Accuracy of Contours

Columbia, S. C.—Chairman Charles C. Wilson, of the Street Commission, in the report of his investigations of bitulithic pavement, has this to say regarding the use of impracticable requirement in the specifications regarding the accuracy of the contour of pavements. "I think I am safe in saying that not a piece of pavement can be found in any city which I visited, either bitulithic, asphalt, wood-block or brick, that will meet the test of three-sixteenths-inch variation from a twelve-foot template, which we have attempted here, and that very little could be found which would come within double that variation. I am convinced that it is impossible to lay a pavement of any plastic material, which has to be surfaced by a heavy roller, to any such standard; and we should simply require the pavements finished to a surface in which waves are not noticeable and in which there are no depressions which will hold water. At no point did I see templates used, and engineers and public works officials whom I consulted advised that they are not required. Both engineers, contractors and foremen were decidedly of the opinion that it was bad practice to put in small patch coats to fill slight irregularities revealed by the template, and I think this method here should be stopped."

Barber Company Submits Proposition on Bitulithic

Camden, N. J.—In submitting a bid where tenders for bitulithic pavement were called for the Barber Asphalt Company handed in a bid with a qualifying letter, in which they said they would lay a bituminous macadam pavement of the exact character prescribed by the specifications, without, however, using the trade-mark designation "bitulithic." If awarded the contract, they suggested the appointment of a disinterested paving expert, who, after chemical and physical examination of a sample of the best bitulithic pavement ever laid, should prepare adequate specifications governing its construction. The Barber Company could then lay the pavement under these specifications and, besides, would give a bond to indemnify the city against any loss sustained through suits for damages for violation of patents or trade-marks. The Warren Brothers did not submit any bid at the letting. Later the fact developed that some other paving company claimed to have a contract for paving the street, so that Council did not venture to award the contract at all—a circumstance which may have been foreseen.

Asphalt Plant Saves \$150,000

Detroit, Mich.—Asphalt Expert Proctor, in his annual report, will say that the municipal plant has saved the city \$150,000 in its patching and resurfacing work during the last five years. He states that of the 1,000,000 square yards that have been laid not one yard has been repaired. During the season of 1908 the plant laid 200,000 yards, using 3,000 tons of asphalt, as compared with the previous year's consumption of 1,800 tons. Recently the repairs and additions have been made to the plant which will enable it to lay 300,000 yards a year.

Narrow Roadway Part of Artistic Plan

Racine, Wis.—After a long controversy, the width of Packard avenue is to be fixed at 26 feet. President P. B. Nelson, of the Park Board, favored the narrow roadway and asked Council for the opportunity to show what could be done towards beautifying residence streets. The sidewalk space next to the curb will be improved under the direction of Jens Jensen, landscape architect.

Must Have Less Paraffine

Kansas City, Mo.—With the last bidding before the Board of Public Works for the letting of contracts for the paving of several streets with asphalt it was intended to bring to a close the acceptance of asphalt containing more than 3 per cent. paraffine. The discovery has been made, however, that resolutions providing for asphalt pavement to the extent of 30,000 yards in excess of bids advertised to be let to-day and admitting of 5 per cent. paraffine are in existence. These resolutions will have to necessarily be accepted, and with these once out of the way the specifications hereafter will reject all asphalts carrying to exceed 3 per cent. paraffine.

Council Refuses to Reduce Term of Guarantee

Oklahoma City, Okla.—The City Council has refused to reduce the term of guarantee for pavement from ten to five years, in spite of the recommendation of Mayor Scales, City Engineer Burke and representatives of many paving contractors. The contractors stated that they would bid from five to ten cents a square yard less for pavements guaranteed for the shorter period. Moreover, they state that bonding companies, after July 1 next, will refuse to issue ten-year guarantee bonds. The Mayor and City Engineer favor the shorter term of guarantee, with more rigid specifications and inspection. The argument which seemed to have most weight with Council was that people who have already paid for ten-year guarantees ought not to be compelled to pay for maintenance of other people's pavements after the shorter guarantee had expired.

Liquid Asphalt Makes Good Road

Trenton, N. J.—The Road Committee of the Board of Chosen Freeholders of Mercer County has inspected the Hopewell and Stoutsburg road, which has recently been macadamized by the C. B. Walton Company and which has been treated with liquid asphalt. The road was found to be in good condition and at present can scarcely be distinguished from an asphalt pavement. The liquid asphalt was incorporated in the road during its construction, being sprayed upon the binder and the finer stone, or top dressing, being rolled into the mixture afterwards. The extra cost was 8 cents a square yard. The stretch of highway treated measures two miles.

SEWERAGE AND SANITATION

Apportionment Cost of Joint Sewage Project

Darby, Pa.—At a meeting of the representatives of the eight boroughs and ten townships which propose to join in the construction of a \$100,000 sewage disposal plant, the question of assessment of cost came up and gave the members considerable concern. Some of the boroughs are opposed to paying for the cost of the sewer and plant at the pro rata population plan. Others are opposed to paying for it according to area of borough.

Canned Aphorisms in the Tuberculosis Crusade

New York, N. Y.—The State Charities Aid Association has decided to send its six canned lecturing outfits to the various cities in the State to aid in the fight against tuberculosis. The outfit consists of a wagon, an attendant and a gramophone. The outfit will go to factories during the noon hour and discourse musical selections alternated with aphorisms regarding tuberculosis. The method was employed in Yonkers, N. Y., where it met general approval, and was again exhibited in Washington during the meetings of the Tuberculosis Congress.

To Purify Shenango

Harrisburg, Pa.—To protect the water supply of the city of New Castle, the State Department of Health has directed the boroughs of Sharpsville, Sharon and South Sharon to prepare for the establishment of sewage disposal and to stop draining their raw sewage into the Shenango River, which supplies New Castle with water. Because the expense of sewage disposal will be heavy, Commissioner Dixon has recommended to the three boroughs that they combine and erect a single disposal plant for all. Sharon and South Sharon recently constructed sewer systems without consulting the Department of Health, as the law requires, with the result that their systems have now been condemned, and they will be at considerable expense to comply with the requirements. Sharpsville, on the other hand, submitted its plans to the Department, and they have been approved.

Objects to Sewer Assessment on Property Valuation Basis

Montclair, N. J.—At a meeting of the Montclair Civic Association Mayor Henry V. Crawford declared that the reason why Montclair had not joined other municipalities in the Passaic Valley trunk sewer was because the proposed assessment against the town was proportionately too high. The Mayor said he thought municipalities should be assessed in proportion to sewage discharged, in which case Montclair's share would be only half as much.

Reward Rat Catchers

San Francisco, Cal.—In order to stimulate the zeal of those who are engaged in ridding the city of rats to prevent the possible recurrence of cases of bubonic plague, twelve rats, each bearing a tab inscribed with a private mark, were turned loose, one in each of the sanitary districts. For the return of each rat so tagged to the office of the Sanitary Bureau a reward of \$50 will be paid. Any regular sanitary inspector bringing in one of the marked rodents will be promoted in addition to being paid the reward. The release and recapture of the rats is expected to aid the authorities in determining the direction in which these animals migrate through the city.

City Will Build Sewers with Local Labor

Sharon, Pa.—Instead of patronizing contractors and having men imported here to do work, the members of the City Council have decided to experiment with sewer building. A resolution was passed instructing the Borough Secretary and the Engineer to purchase material and lay a sewer in Budd avenue. The work will be done under the supervision of Street Commissioner Calahan. This will afford work for a large force of men now residing here and the chances are that if the work can be done at a profit the city will in the future build the most of its new sewers.

WATER SUPPLY

Pumping Station in Brooklyn Finished

Brooklyn, N. Y.—The new Canarsie pumping station on East Ninety-second street is practically completed and will be opened for operation about January 1 next. The station is equipped with two 5,000,000 gallon pumps, and the supply will come from wells in the neighborhood sunk to a depth of about 175 feet. The whole output will be delivered to the southeastern section of the borough.

High Service Pumping Station Completed

Duluth, Minn.—The "booster" plant of the city water system, designed to keep the reservoir on the hill at Sixty-fourth avenue west supplied with water has been put in operation. The plant is located at Sixth street and Forty-fifth avenue west, where the large supply main ends. The installation consists of two centrifugal, electric-driven pumps, with a joint capacity of 6,000 gallons a minute. The new plant will also enable the city to supply the Duluth, Minnesota & Northern Railway with water which they will pump to Proctor.

Texas May Undertake Analysis of Water Supplies

Austin, Tex.—State Health Officer Brumby intends to ask the next Legislature for a special appropriation to be expended in making an analysis of the water supply in the various cities and towns in the State. The minimum cost for making a chemical and bacteriological analysis is between \$10 and \$15, and consequently until a special appropriation is made it will be impossible to keep up the work. Analysis of the water at several places have been made by the State Health Department, and in some instances the water has been found to be far from pure. Therefore this work is considered of prime importance, but Dr. Brumby says it will be impossible to prosecute the work with any degree of success unless he has the money to do it. He estimates that it would cost about \$5,000 a year to maintain such a department in connection with the State Health Department.

Finds Pure Water for Burlington

Burlington, N. J.—A report of C. C. Vermeule, Consulting Engineer, to I. Snowden Haines, President of the City Council, offers a solution of Burlington's 10-year fight for pure water. Vermeule declares that the springs and test wells along the hills near the lakes south of the city show a supply of fine quality and a quantity more than sufficient for the city's needs. In fact, for a large part of the year pumping will be unnecessary and water will flow from springs by gravity to the city. The water contains iron, which can be removed by a simple process. Council will appoint a day for an election for the people to choose between the Vermeule plan and a system of filtering water from the Delaware River.

Ownership Would Save \$300,000 Annually

Jersey City, N. J.—The municipal affairs committee of the Jersey City Board of Trade, with the assistance of a number of city officials, has prepared a report recommending changes in ownership of water supplies and in the management of the works which, it is claimed, would result in the saving of \$300,000 to the city. The most important recommendation is the acquisition of the Boonton plant and the issuing of \$7,000,000 bonds to pay for it instead of, as at present, purchasing water from the Jersey City Water Company at a total cost last year of \$484,000. The amount of water purchased from the company was 10,000,000 gallons daily less than the Boonton plant would supply. This excess if it flowed to the city could be sold at a good price. The difference between the interest charge and the purchase price now paid for water, together with receipts from the surplus, constitute the main saving which the Board of Trade committee points out. The present financial condition of the water works, with \$12,000,000 assets and \$3,000,000 debt, would be a guarantee of the sale of the bonds at a low price.

Future Water Supplies for Washington

Washington, D. C.—Increased supply of water for Washington is contemplated, dependent upon the anticipated approval of Congress, as the result of preliminary surveys of proposed projects by Army Engineers working under direction of the Washington aqueduct. As a result of field work during the past summer Major Spencer Cosby reports to the War Department that he has practically completed surveys for two alternative projects to meet the situation. One of these surveys is for the so-called tunnel project from Great Falls with reservoirs in Cabin John Valley. It included subsurface investigations at several possible dam sites in that valley. The other surveys involved the possible location of a reservoir for a high-level supply project in the upper part of Rock Creek. These latter surveys are still in progress. Major Cosby says the Rock Creek reservoir is a new development and was not foreseen when the surveys were inaugurated.

Natural Filtration in Place of Mechanical

Norfolk, Va.—Engineer T. B. Dornin, in charge of the water works, has sent a report to the Board of Control advising a change in the method of supplying the city with pure water. He advises the abandonment of the present system of rapid filtration and the substitution of natural sand filtration. He would sink wells along the border of the lake and canals from which the city now gets its water. The water would have to pass through a bed of 30 feet of sand to get to these wells, and the results, based on Mr. Dornin's tests, indicate that the purification would be even greater than now. Moreover, there would be a saving of \$13,000 annually, which is now the cost of operating the mechanical filters.

Vetoes Sale of Water to Private Companies

Reading, Pa.—Mayor Rich has vetoed an ordinance authorizing the Board of Water Commissioners to enter into contracts with the Glenside Water Company and the Reading Suburban Water Company for the sale of water. The Mayor doubts whether the contract would be legal any way, and reminds Council of the fact that a bill authorizing the municipalities to sell water to private companies once passed the Legislature and was vetoed by a former Governor. The argument of expediency, however, is strong. If outsiders are given all the advantages of citizens without paying the taxes there is no inducement for them to seek admission to the city.

STREET LIGHTING AND ELECTRICITY

Committee Collects Data About City Lights

Dallas, Tex.—The Lighting Committee of the Board of Municipal Commissioners is compiling data received from other cities covering electric and gas lighting. The information sought concerns such questions as rates, number of lights used, number of nights per month burned, distance between lights on streets. Among other matters, the committee is gathering information regarding municipally owned gas and electric lighting plants. It is the desire of the committee to arrange for a wider lighted territory and to have a greater number of lights. Another matter, one of law, has been referred to the City Attorney. It is desired to find out to what extent the steam and electric railways may be compelled to bear the expense of lighting all or any parts of the streets over which they pass.

Overhead Wires and Signs to Go

Leavenworth, Kan.—Mayor Cramer has announced that the telegraph, telephone and electric light companies will be obliged to comply with the regulations requiring that all wires within a prescribed district, including the business section of the city, shall be placed in underground conduits. The conduits will be laid in the alleys in the downtown section and under the packings in the residence portion of the prescribed district. In conjunction with this movement an ordinance is being prepared permitting electric signs to extend across the sidewalks during the hours when illuminated, but all other signs will be restricted to a distance of three feet in horizontal projection from buildings.

Meadville's New Lighting Plant

Meadville, Pa.—The new city lighting plant built by Superintendent Ellsworth has been put in operation with 126 lamps in place. With the exception of a portion of the old wire line, the plant is entirely new, and represents a cost of something less than \$23,000, a few hundred dollars within the appropriation. The new work includes about 16 miles of wire, 120 lamps, about 150 new poles, and a complete duplicate power plant, each with a capacity for 200 lamps. The power plant, located in the water pumping building, includes one Riverside gas engine, 160-horsepower, with two arc generators, and the reserve set is one 150-horsepower steam engine, connected with its own pair of arc generators.

Municipal and Private Electric Plant Complete

Pasadena, Cal.—A rate-cutting war is in progress between the Edison Electric Company and the Electric Department of the city over the supplying of current commercially. The company's employees follow up the city men closely, and where a meter is installed they offer current at a flat rate less than the city's minimum. The books of City Electrician Reeves are open and are found very convenient for Edison men to look over and copy the names of applicants for electricity. In spite of the low rates offered, it is said that the city is not losing many of its new customers.

Wants Red Lamp Over Every Fire Alarm Box

Rochester, N. Y.—City Engineer Fisher is trying to devise a plan whereby a red lamp can be placed over every fire alarm box in the city, so that the position of a box can be seen at a glance. Questions of cost will have to be considered and mechanical difficulties worked out. Little trouble will be experienced downtown, where there are wires for incandescent lighting. In outlying sections, where arc lighting is the method of street illumination and there are no incandescent light wires, the problem becomes difficult. No plan has yet been devised for carrying current from the high-tension lines strung high above the street or in conduits to the standards on which the fire alarm boxes are installed, except at a prohibitive cost. If the arc light current is used it will, for safety, be necessary to carry the wires underground. Estimates made so far indicate that the cost will be about \$15,000 for equipping the 300 boxes in the city.

Four-Light Electroliers Installed in Business Streets

St. Louis, Mo.—Pine street is the first to respond to the Civic League movement for better lighting of the downtown streets and for a uniform system of illuminating the section bounded by Fourth and Twelfth streets, Washington avenue and Market street. New four-light electroliers, which have been permanently installed on Pine from Fourth to Tenth street are getting their introduction in connection with the festival illumination of the downtown streets and are attracting as much attention as the more elaborate temporary lighting. There are 10 electroliers to each block, and they brilliantly illuminate the thoroughfare. The Street Lighting Committee of the Civic League will call a meeting shortly of property owners and merchants of the entire downtown district at the Mercantile Club, and an effort will be made to induce them to follow the example of Pine street and install the electroliers on all the streets.

FIRE AND POLICE

Plans Drawn for Interurban Fire Protection

Boston, Mass.—In accordance with suggestions of Chief Mullen, outlined in a paper read before the Massachusetts Firemen's Association, plans are being perfected for a system of interurban fire protection, including all the departments within 40 miles of Boston. Former Fire Commissioner Benjamin W. Wells and Chief Henry A. Spencer, of Chelsea, are members of the committee drawing up detailed plans. Their first work will be to get the plans for co-operation within a 10-mile limit of the State House in working order. This territory has 86 fire engines. Legislative action is looked for which will make the cooperation mandatory.

Object to Wearing of Police Uniforms by Constables

Paterson, N. J.—If the Police and Fire Board can prevent it constables and other special officers who now wear uniforms that correspond to the style adopted for the Police Department will no longer be privileged to wear the regulation clothes of regular officers. There are many reasons why it is desired to bring about this change, chief among which is the free and easy manner that some of these constables and special officers adopt when they are doing duty at picnics and balls.

Storage and Sale of Gasoline Regulated

Buffalo, N. Y.—The ordinance regulating the storage and sale of gasoline and other light explosives has been amended. No person will hereafter be allowed to keep for sale or store gasoline in quantities larger than five gallons without a license. The license will be \$1 for retailers and \$20 for wholesalers. All naphtha, gasoline, benzine or other easily inflammable or volatile liquid or substance shall be kept in metal containers free from leakages and wherever practicable shall be required to be placed under ground with the tops of such containers or receptacles not less than two feet beneath the surface of the ground, and as far removed as possible from all inhabited buildings.

High Pressure for Chicago

Chicago, Ill.—Chicago's much-needed high-pressure water system has been completed, but only on paper. The cost, \$2,500,000, is not as insurmountable an obstacle as the depleted condition of the city treasury might indicate. More than 40 per cent. of the property owners, whose holdings would be affected by the new system, have expressed themselves as favoring a special assessment to defray this cost. Mayor Busse's joint committee, which returned from New York after viewing a test of the recently installed fire apparatus there, is enthusiastic in its praises of the New York system, but has many improvements to suggest for the Chicago one.

Water Works in Fine Condition

Louisville, Ky.—President Zorn, of the Water Company, says that he has at last eliminated politics from his department and that it is on a business basis. Last year the city received \$165,000, and in a few years the company should be paying the city a dividend of \$200,000 or reduce the cost of water to consumers by that amount. Mr. Zorn has introduced a system of daily reports that show how the forces are employed. Each man in charge of a section of work is held responsible for results, and comparison is made with others doing similar work. One statement that has been prepared shows that the cost of putting water in the mains last year was \$5.50 per million gallons; this year less than \$4.16. In the Assessor's office bookkeeping has been so simplified that 30 ledgers suffice where 96 were formerly used.

Compares New York with Six Combined Departments

New York, N. Y.—The Merchants' Association has published some data regarding the operation of the New York Fire Department as compared with the combined departments of Chicago, Philadelphia, St. Louis, Boston, Baltimore and Cleveland. It is found that New York employs 15.83 men per machine (engines and ladder trucks). The average number of men per machine responding to alarms in New York is 7.3; in two of the combined figures it was 7; in one 6 to 7, and in one 6; for the other two data were lacking. In 1907 New York employed 4,179 firemen to operate 264 machines. In 1905 in the combined cities an equal number of machines were operated with 3,091 men. The results are due to the greater time allowance or "days off" allowed in New York.

Guard Against Fires in Park Reservations

Orange, N. J.—Because of the continued drought the Essex County Park Commission has taken steps to prevent, if possible, forest fires in the South Mountain and Eagle Rock reservations. A corps of 12 men are patrolling the woods, carrying hand extinguishers and clubs to beat out the flames. A fire alarm signal code is in operation. The reservations are divided into five districts, and when a blaze is found by one of the patrolmen he blows on a whistle the number of blasts corresponding to the number of the district. Another alarm is given by striking an iron railroad tie at the South Mountain reservation stables. In this way the fire-fighting force is brought together and an old chemical engine is sent into the district.

May Enter City Fire Lines

Milwaukee, Wis.—The action of Chief Clancy, of the Milwaukee Fire Department, in charging for services at fires outside the city limits has brought a change of heart in the big manufacturers on the subject of annexation. A movement is on foot for the consolidation of the county and city government, for "home rule," and to aid this ultimate accomplishment the promoters, who include the Mayor and the city officials, real estate and insurance men, are trying to annex the suburbs of West Allis, South Milwaukee, Cudahy, North and East Milwaukee and Wauwatosa. Most of the big manufacturing plants, especially the iron and steel lines, are situated in the suburbs, where they escape taxation on city rates, but now that they will no longer have advantages equal to those of property owners within the city limits, without the cost, annexation is favored.

Practical Operation of High Pressure Service

New York, N. Y.—What ordinarily would have been a two-alarm fire was quickly controlled on October 28 by use of the new high-pressure water system. The fire caused a damage of \$25,000 to the five-story building at No. 80 Franklin street, occupied by five business firms. When Deputy Chief Guerin arrived he found the fire, which had started on the second floor, shooting out through the roof. In the rear the building was ablaze from the first floor to the top. The engines were not used. They stood idly by. The water tower was placed in front of the building and two lines from it sent their streams into the upper floors. Two other lines were run in front of the building, one on the fire escape and the other up the stairs, while still two more were taken to the rear. All of the hose was attached directly to the high-pressure plugs, and was worked under 100 pounds pressure, which is light work for the new system. After the fire was out the engines were called into use for "washing down."

Military Drill Adopted for Philadelphia Police

Philadelphia, Pa.—A new order has been issued by Director Clay at the suggestion of Assistant Superintendent O'Leary which provides for military drill on the part of the police, and is designed to effect an organization as well drilled as the State militia. Once each week each of the two squads, into which the districts will be divided for the purpose, will meet and drill under the command of the sergeant in accordance with instructions prepared by the Department drill master. The program will include marching in military formation and setting-up drills.

San Francisco Fire Boats

San Francisco, Cal.—The two new fire boats for which contracts have recently been let will be identical in structure and equipment. They will be built of steel of the following dimensions: Length over all, 129 feet; length between perpendiculars, 120 feet; beam, moulded, 26 feet; depth, moulded, 12 feet 9 inches. Each boat is to be a single-deck hull with a deck-house over the space occupied by the boilers and machinery and with a raised pilot-house at the forward end of the deck. Each boat will have two engines of the compound, direct acting, inverted cylinder type, with a high-pressure cylinder of 13 inches in diameter, a low-pressure cylinder of 26 inches, and a common stroke of 20 inches. The boilers, two in number, will be built for a working pressure of 200 pounds per square inch, and will have a combined heating surface of 5,400 square feet. There will be two sets of pumps of the multistage turbine type, each capable of delivering 2,000 gallons a minute at a pressure of 150 pounds—a total capacity of 8,000 gallons a minute. The pumps will have connections so that one pump can deliver into suction of the other, so that half the amount of water may be delivered at 300 pounds pressure. On top of the deck-house will be two monitors and a water tower with interchangeable nozzles up to four inches in diameter. Water shields will be provided to protect men in charge of nozzles when working close to a fire.

GOVERNMENT AND FINANCE**Drafting City Charter for Boston**

Boston, Mass.—With a determination to draft at the earliest possible moment a revised charter for the city of Boston, the Finance Commission is holding evening sessions on Monday, Wednesday and Friday of each week and devoting those sessions entirely to charter revision. The Commission already has drawn a rough draft of its proposed revision of the charter, which will be incorporated in a bill which will be presented to the next Legislature, and it is for the purpose of revising and perfecting that rough draft that the evening sessions are being held.

Civic Improvement for Moral Advancement

Chicago, Ill.—As a cure for criminality in Chicago, Alderman William E. Dever urges that the municipal government set aside each year a sum of money to be used in condemning houses unfit to live in, razing the structures and making breathing spots for children to play in. This idea was proposed in the course of an address on "The Human Interest in Municipal Government" at a dinner of the Chicago Credit Men's Association. Alderman Dever, in the course of his speech, proposed that every house in the city that is unfit to live in should be torn down. He asked the building of 10 playgrounds in every ward and the appointment of a municipal commission to uproot and tear out the evil conditions along the west side of the river due to poor housing. "Our failure in municipal government up to this time in Chicago is due to the fact that we have neglected the human side of things," he said. "It costs the city of Chicago about \$15,000,000 every year to handle criminals. This amount is not spent in the curing of crime. We must take up this latter idea to be a happy city."

New York City Budget Adopted

New York, N. Y.—Final figures for the city budget of 1909 have been announced by the Board of Estimate and Apportionment. The total is \$156,545,148, an increase of \$12,972,881 over the present budget. The result is a compromise between the fight of the borough presidents for larger appropriations and a number of civic organizations for general economy. More than half of the increase in the budget is for redemption of the city debt, i. e., interest and sinking funds.

St. Louis Has Plenty of Funds

St. Louis, Mo.—The municipal government of St. Louis has on hand now about the largest amount of money in its history. Tax collections early ran unusually heavy, which, coupled with returns from the sale for various city improvements, put the city balance on an unusually high figure. Just now the city has about \$10,600,000, and will continue to have about that amount for many months to come. As a result there was rather keen competition among the various banks to secure city deposits, and considering the fact that money generally is so plentiful, the rate of interest bid to secure the municipal deposits was high. The average rate offered by the Clearing House banks was 2.58 on regular deposits. This, however, is under the average rate last year, which was 3 per cent. All the banks bid 2 per cent. on the supplementary deposits, except the Franklin National, its bid being 2.10 per cent. The high bidders will receive \$500,000 each in regular deposits and the balance will be divided in \$300,000 lots as the supplementary deposit.

Shortage in 'Frisco Treasury

San Francisco, Cal.—In an endeavor to fix responsibility for a shortage of \$37,500 in the City Treasury a committee of investigation has made the unexpected discovery that funds to the extent of \$30,000 more are missing. Criminal prosecution is foreshadowed in the detention by the authorities of James G. Tomally, for several years a bookkeeper in the office. Expert accountants declare that the money was taken during the term of former City Treasurer Charles A. Bantel, and experts declare the books have been altered.

To Tell How City's Money Is Spent

Grand Rapids, Mich.—During the winter a series of eight lectures will be delivered by the Mayor and the heads of city departments on the general subject "How the City Spends Your Money." The separate lectures will be on the following subjects: "Board of Education," "Board of Library Commissioners," "Board of Park and Cemetery Commissioners," "Board of Health and Poor Commissioners," "Board of Fire and Police Commissioners," "Board of Public Works," "Comprehensive City Plan," "Work of the Mayor, Other City Officials Not Included in Former Lectures and the Budget."

REFUSE COLLECTION AND DISPOSAL**Eight-Hour Law Increased Street Cleaning Cost**

Baltimore, Md.—Notwithstanding the heavy extra expense with which the city will be burdened, the eight-hour law will be rigidly enforced in the Street Cleaning Department. Colonel J. L. Wickes states that to avoid any trouble that may arise by reason of the possible violation of the law as passed by the last Legislature, he will himself see that no man in his Department works more than eight hours on the streets. To do this the city will have to expend about \$150,000 more than it did last year in keeping its thoroughfares in a cleanly condition. This year the Colonel's expenses were only \$612,579, while for next year he says he cannot get along on less than \$781,000.

Oakland Inventor Claims Improved Process

Oakland, Cal.—The Board of Works is looking into a plan presented by a local inventor which promises the disposal of all garbage expeditiously, cheaply and without noisome odors. A small plant constructed after the idea of the inventor has been in operation for some months, and he proposes to build a bigger one. Briefly, the process in the new system for the reduction of garbage is as follows: The refuse is collected by scavengers and taken to the incinerator. No attempt is made to separate the varied elements which go to make up a city's daily collection of garbage; tin cans, bones, leather, bits of clothing, the whole heterogeneous mass that, in the lump, is garbage, is carted away to the incinerator. At the plant this refuse is placed in a hydraulic press, where it is compressed. From the press it is dumped into huge sheet steel retorts, which are then tightly closed in order that no odors may escape, and are then lifted by enormous cranes into the incinerator, where they are subjected to such intense heat that the whole mass is rapidly reduced to charcoal. The residuum left in the retort, by actual measurement made in extensive trials, is about one-fifth of the original mass placed in the retort. It is absolutely odorless and will be used as fuel to provide the heat for the reduction of the garbage. Naturally, in this reduction process a number of by-products are formed, the principal of which is ammonia, a product of commercial value. By means of apparatus designed by the inventor this ammonia, together with the other by-products, is saved. A large amount of gas is also given off from the retort while the reduction is going on, and this gas is collected, washed and used as fuel by the incinerator. Every precaution is taken to guard against the escape of noxious gases into the air and it is claimed that absolutely no odors are noticeable in the vicinity of the reduction works. Experiments conducted over a series of months demonstrate that this reduction process generates sufficient gas to do the burning of the garbage and sufficient charcoal is obtained after the first starting of the furnace to provide for all subsequent startings. When the garbage is reduced there remains in the retorts nothing but clean, odorless charcoal. The by-products, of which there are several, are all commercially valuable, and will produce a revenue of about 25 cents for every ton of garbage reduced. The cost of reduction is estimated at 50 cents a ton.

RAPID TRANSIT

Will Check New Subways

Brooklyn, N. Y.—The recent decision of the Appellate Division of the Supreme Court in Brooklyn, sustaining the claim of property holders in Joralemon street, that the awards for damage to their property by the construction of the subway were inadequate, has caused considerable uneasiness among the city officials in regard to the building of other subways. Comptroller Metz states that these damages are paid from revenue bonds for claims, which bonds are paid out of the budget for the ensuing year, and therefore directly affect the tax rate. If the same ratio of damage which has been applied under this decision to Joralemon street is applied to Fulton street the total of the city's liability, in case this decision shall be sustained, will be in the neighborhood of \$25,000,000. If this rule is to be sustained by the Court of Appeals subway building in Brooklyn will be so expensive that the damages which the city will have to pay will be four or five times more than the cost of subways themselves. The grounds for the decision are that the city in building a subsurface road deprived the abutting owners, who own the fee of the street, of substantial property rights. In Manhattan and the Bronx the city owns the fee of the streets.

Distribution of a Car Fare to Different Accounts

Chicago, Ill.—The Board of Supervising Engineers engaged in rehabilitating the Chicago traction system have published a report which includes the following statement of the proportions of each 5-cent fare which is distributed to the several accounts:

Disposition.	Cents.
Paid in wages to employees.....	2.24
Paid for material, supplies and other expenses incident to the maintenance, operation and management of the railways	1.14
Paid for taxes.....	.12
Interest on value of properties.....	.75
Profit paid to the railways.....	.34
Profit paid to the city.....	.41
Total	5.00

One Fare Good to City Line

New York, N. Y.—Judge Lacombe in the United States Circuit Court handed down an opinion recently in which he directs Receiver Whitridge of the Union Railway Company to run the cars of that company to the northern boundary line of the greater city (242d street) for a single fare. A few weeks ago the Receiver cut off the service above 233d street on the White Plains road, making it necessary for persons who wanted to go to 242d street to pay a second fare. The tracks from 233d street to 242d street are owned by the Westchester Electric Company. The Union Railway Company paid for the use of that line of track, and it was on the plea that he could not afford to continue these payments that Receiver Whitridge stopped the service above 233d street.

Tunnel Must Wait Business Revival

Providence, R. I.—The unwillingness of the New York, New Haven & Hartford to continue negotiations with the City Council committee in charge of the tunnel plan for East Side trolley cars probably will be announced in a few days. It is understood that the committee desires to make a report, and that the company has been asked to say whether or not it will build a tunnel under North Main street in order to avoid taking part of the yard of the First Baptist Church. The answer to this question will be a general statement that until there is a decided revival of business and a marked increase in trolley earnings the Rhode Island Company is not inclined to consider the expenditure of a million dollars for a tunnel extending from Canal or North Main streets to Thayer street.

No Passes for City Employees in 1909

Minneapolis, Minn.—According to Frank Healy, City Attorney, free transportation for policemen, firemen and inspectors in the city Health Department cannot be accorded by the Twin City Rapid Transit Company after the first of next year. The so-called anti-pass law goes into effect January 1, 1909, and the City Attorney holds that the law applies to street railroads as well as to railroads within the State. Deprivation of such privileges now enjoyed by these employees will seriously embarrass their departments next year. Uniformed firemen and policemen are carried free on street cars, and books of tickets are furnished plain-clothes men in the Police Department.

MISCELLANEOUS

Augusta Again Supplies Power for All Factories

Augusta, Ga.—Repairs to the hydraulic canal damaged by the August flood have been so far repaired that all factories obtaining power from it started operations October 30. Some of the factories, as well as the city water works, have been in operation ten days or more.

Charles River Basin Closed to Tides

Boston, Mass.—The gates of the dam forming the Charles River Basin were recently dropped, shutting out the effect of tidal action above the dam forever. The fresh water basin thus formed, after five years of continuous work will be 7½ feet above low water mark. A lock will be maintained capable of accommodating vessels with a draft of 17 feet. Up to date the dam has cost \$2,500,000. The dropping of the gates was the occasion for the gathering of Governor Curtis Guild, Jr.; Lieutenant-Governor Draper, Mayor George A. Hibbard of Boston, Mayor Walter C. Wardwell of Cambridge, Mayor George Hutchinson of Newton, Mayor Edward A. Walker of Waltham and the Selectmen of several towns along the river.

Effect of Boulevards on Adjoining Property

Indianapolis, Ind.—At a recent meeting of the Board of Park Commissioners there was also an informal discussion by members of the effect boulevard improvements have on abutting real estate. An interesting letter touching on the subject, written by the Superintendent of Parks in Kansas City, was read. This showed that in some instances property had been increased in value 100 per cent. by such improvements.

Work of the City's Surveyors

San Francisco, Cal.—The earthquake and fire of April, 1906, caused a general shifting of street and property lines and made necessary the resurvey of the burned section of the city and the establishment of new monuments. The Surveying Department of the Bureau of Engineering has been engaged on this work ever since, in addition to transacting the usual routine of the Department. An idea of the vast amount of work being carried out by the city's Surveyors is obtained from a report recently prepared for transmission to the Board of Public Works. It shows that between January 1 and October 1, 1908, 290 surveys ordered by the Board of Public Works and 792 ordered for contract work were completed. These 1,082 surveys covered 3,246 blocks. In addition, 418 blocks were resurveyed in the Fifty Vara District; 423 blocks in South San Francisco were resurveyed for profiles; 250 blocks for precise levels; 78 blocks in the Lakeview District and 14 in the Western Addition, making a grand total of 4,429 blocks. These figures do not include about 1,500 surveys for street crossings. The Department also made 14 surveys for Hetch-Hetchy reservoir sites and defined the lines of the city's holdings, known as the Almshouse Tract. The Board of Supervisors recently set aside \$10,000 for the resurveying and establishment of lines in the University Mound Tract of about 480 blocks. Surveying parties are at present in this tract, and it is expected that their work will be completed about January 1.

LEGAL NEWS

Summary and Notes of Recent Decisions—Rulings of Municipal Interest

TAXATION OF WATER COMPANY FRANCHISE

People ex rel. Jamaica Water Supply Co. vs. State Board of Tax Commissioners.—In determining the value of the intangible property of a water company for the assessment of the franchise tax there should be deducted from the earnings of the company salaries, expenses of maintenance, and taxes, including the franchise tax, together with such percentage of earnings as is reasonably necessary to create a fund for the replacement of the plant, and the balance of the earnings should be treated as the actual net earnings, and 6 per cent. should be deducted as a fair return on the value of the real estate and other tangible property, and the surplus earnings should then be capitalized at 6 per cent., and the result will represent the fair value of the intangible rights of the company, to which should be added the value of the tangible property, and the result represents the value of the special franchise, which should be assessed on the same basis as other property is assessed.—New York Supreme Court, Appellate Division.

CATTLE RUNNING AT LARGE

Geer vs. Thompson.—Under the general welfare clause of its charter the City Council of Colquitt had authority to pass an ordinance prohibiting the running at large of cattle within its incorporated limits, without regard to whether the county of Miller, in which the city is situated, had adopted the provisions of the stock law or not. An action in trover, brought to recover possession of cattle, can be successfully resisted by proof that the cattle were legally impounded, in accordance with a proper ordinance, by the Marshal of an incorporated town or city. In such a case there is in fact a failure on the part of the plaintiff to make out his case, because the maintenance of an action in trover depends as much upon showing conversion on the part of the defendant as upon proof of title in the plaintiff.—Court of Appeals of Georgia.

WIDENING STREETS—ASSESSMENTS

City of Seattle vs. Meteor Land Co. et al.—Failure of the commissioners, in condemnation proceedings to widen a city street, to assess a part of the cost against the general fund of the city, or against property outside the assessment district created by the commission, and the assessment of some property within the district for less than its proportionate share of the cost, are not reviewable on appeal by property owners from a judgment confirming the assessment roll, since the assignments present matters of fact and opinion, and the court cannot substitute its judgment for the judgment of the commission. An assessment by the commissioners in eminent domain proceedings to widen a street, based largely on the value of the property, because the commissioners were of the opinion that the benefits to the property within the assessment district were in proportion to its value, is not an improper method of determining the amount of the assessment, with reference to the rule that the assessment should be based on the resulting benefits.—Supreme Court of Washington.

DEDICATION OF STREET

People ex rel. Washburn vs. City of Gloversville.—An owner placed his house so near to the street line, as shown by a map previously filed in the County Clerk's office, that the porch encroached on the street. Subsequently the municipality sought to take a strip to widen the street, and thereby brought the new street line within 2 1-2 feet of the house at a point where the old street line was 4 1-2 feet away. Held, that the expense of moving the entire house could not be included in awarding damages for the taking.—New York Supreme Court, Appellate Division.

ASSESSMENT—DETERMINATION OF DATE

City of Escondido vs. Escondido Lumber, Hay and Grain Company.—Municipal Corporation Act provides that all taxes assessed shall constitute liens on the property assessed from the first Monday in March of each year. Held, that the provision is not inconsistent with the power given the Board to fix a day other than the first Monday of March to which the assessment shall relate; taxes not being a lien unless expressly made so by statute, and the time when the lien will attach, if at all, being determinable by the statute.—Court of Appeal of California.

CONTRACT—ACTION ON BOND

Atlantic Trust and Deposit Co. vs. Town of Laurinburg.—A town had plans and specifications made for a complete water and sewer system, and advertised for bids for the same, all of which were rejected because they exceeded \$34,000, which was all the town purposed to expend. The engineer of the Southern Contracting Company, which was the lowest bidder, then proposed that his company would construct the system within such limit, if certain changes were made in the specifications, and, his proposal being accepted, a resolution prepared by him was adopted "that the plans and specifications by * * * be revised for a completed plant, without extras, and be constructed by the Southern Contracting Company at cost plus 10 per cent. for material furnished and work done, the total amount not to exceed \$34,000." The company then gave a bond, with defendant as surety, conditioned for the performance of the contract "for the amended construction of a water and sewer system" for the town "upon a basis of 10 per cent. upon the materials and labor furnished, not to exceed \$34,000." The bond also gave defendant the right to complete the contract on default by the principal. The company, after doing a part of the work, abandoned the same, and, defendant refusing to complete it, the town did so, as authorized by the contract, at a total cost largely exceeding \$34,000. Held, that the contract was not one to do work for the town on account of its water and sewer system to the extent of \$34,000 on a commission of 10 per cent., but was one for the completion of the system in accordance with the amended specifications at a cost not to exceed \$34,000, and less if the actual cost, including 10 per cent. profit to the company, should be less, and that defendant was liable to the town for the damages sustained by its breach, to the extent of the penalty named in the bond. In an action on such bond, in which the declaration alleged a breach of the contract by abandonment of the work, to the damage of the town in the full penalty of the bond, the town was entitled to prove what it did in completion of the work in accordance with the specifications, and the amount expended therein. In an action of debt on a bond with collateral conditions, the declaration is not required to set forth the damages alleged, but only the breaches; and when the breach alleged is the abandonment of the contract, the performance of which the bond was given to secure, and the damages are alleged to equal the full penalty of the bond, the specific details of damages cannot be required to be set out. The strict rules governing the liability of sureties growing out of the ordinary relations of creditor and simple surety are not as fully applicable to the contracts of a bonding company insuring the performance of contracts as a business and for profit.—United States Circuit Court of Appeals.

IMPROPER SUSPENSION—RECOVERY OF SALARY

Bullis vs. City of Chicago.—A patrolman improperly suspended on charges, if entitled to recover salary during suspension, is entitled to recover his entire salary which had not been paid to any one performing the duties of his office, regardless of his earnings or opportunities to earn money during the time he was suspended.—Supreme Court of Illinois.

WATER COMPANY—INTEREST ON UNPAID RATES

Appleton Water Works Co. vs. City of Appleton.—A water company furnished water to a city under a contract providing for the payment of a stated price therefor every six months. After a number of years the company claimed that the contract had expired, and presented monthly bills at a higher price, claiming an implied contract to pay what the service was worth, which bills were rejected. Held, in an action to enforce such payment, in which it was determined that the express contract was still in force and plaintiff was allowed to recover thereon to avoid a second suit, that there had been no demand of payment under the contract which entitled it to recover interest; it appearing that the city had been at all times ready to pay in accordance with the contract.—Supreme Court of Wisconsin.

SIDEWALKS—DIFFERENCE IN LEVEL

McIntyre vs. City of Kalamazoo.—Where a city builds two connecting sidewalks, one a few inches lower than the other, and joins the two by a cement apron, which has a face of 14 inches, and which at its upper edge raises the level of the higher walk 1 1-2 inches, there is not a defect, which will make the city liable for injury to a pedestrian by falling, on account of the difference in levels, and not because of any want of repairs, in stepping from the higher to the lower walk.—Supreme Court of Michigan.

DISCUSSIONS, QUESTIONS AND ANSWERS

Readers of the Municipal Journal and Engineer are invited to send for publication in this department inquiries concerning such matters as can probably be answered from the personal experiences of others, or from information on file in this office. Any who can furnish the desired information are requested to do so, in addition to any reply which may be given by us. It is especially desired that an exchange of opinions and discussions on mooted subjects find place here. We will welcome any opinions, whether or not we agree with them; requesting, however, the omission of all personalities.

CAUSES OF HIGH BIDS

Editor MUNICIPAL JOURNAL AND ENGINEER, New York City:

DEAR SIR—Regarding your request of October 14 for data concerning the cost of contract work, I have the honor to say that our contract work at the present time is in such a condition that I would rather not send the figures, as they are extremely high. Our State laws are such that on all of our work for public improvements which are paid for under special taxes (which is practically all of our work at present), the contractor is compelled to take his pay in scrip, which for some reason has greatly depreciated in value, hence their bids are always high. A further reason for this is that the city government has allowed property owners to make private contracts for sidewalks, curbs and gutters, and asks for bids only on such small portions as remain undone under private contract. You may see that, for all of the above reasons, the costs of our work are very hard to arrive at; and there is the additional one that we have to take lump sum bids, so that we really know very little about the detailed cost.

I trust the above explanation gives satisfactory reasons why our data would not be desirable for the information of contractors. I hope these conditions will change, as they are very unsatisfactory to the Engineering Department.

This letter was received by us in reply to our regular request for information concerning bids received. As we are uncertain as to whether the writer intended this for publication we refrain from giving the name of the city. Some months ago we referred to the undesirability of paying contractors in anything other than cash; and this letter further emphasizes this. In most of such cases the excuse is offered that State laws or city charter require such methods. If they really do, the cities of the State should certainly combine to have them changed. Even with their existence, however, the difficulty can sometimes be met indirectly. Thus, the sinking fund commissioners in some cases take short time bonds or city scrip, which does not find a favorable market, and thus permit the city to make payment in cash.

We would like to learn from our readers what other cities are similarly handicapped and in what ways such difficulties are overcome by them.

RESERVOIR STORAGE CAPACITY AND COST

EDITOR MUNICIPAL JOURNAL AND ENGINEER,

239 West Thirty-ninth street, New York City:

Dear Sir—I would like to get some data on the cost of reservoirs as compared with their storage capacity; that is, I would like to get the cost of construction, including the dam, stripping of the reservoir site, spillways, gate houses and all other construction connected with the reservoir, except the conduit leading from the reservoir to the city, and compare this with the number of million gallons which the reservoir is capable of storing, so as to give the cost of construction and number of millions of gallons stored. Can you give me any information on the subject?

Yours respectfully,

Troy, N. Y.

E. L. GRIMES, City Engineer.

The cost of storage reservoirs of a given capacity would depend so largely upon the topography in each case and also upon the distance to and accessibility of the materials used in construction, that any uniformity in cost of reservoirs in various parts of the country could not be expected. In general, it would seem probable that the cost per million gallons would decrease as the size of the reservoir increased. But this again

might not hold with all conditions of topography.

The federal government a few years ago collected statistics concerning the water works of all the cities of the United States, among these being the cost of all the works at the storage site of each of the gravity plants. We have arranged these figures in classes, according to the capacity of the storage reservoirs, and obtained the following information.

The average cost of 31 reservoirs having a capacity of from 0.1 to 1.0 million gallons each was \$8,213 per million gallons. Of 33 having a capacity of from one to ten million gallons the average cost was \$3,486 per million gallons; of 23 holding from 10 to 100 million gallons the average cost was \$789 per million gallons. Of the 24 holding from 100 to 1,000 million gallons the average cost was \$623 per million gallons; and of the 14 holding over 1,000 million gallons each the average cost was \$361.50 per million gallons. It is seen from this that the average cost per million gallons does decrease as the size of the reservoir increases.

When we compare individual cases in any class with the average of that class, we find, as was anticipated, great variation. In the first class the costs varied from \$375 to \$34,700; 21 of the 31, however, cost between \$2,000 and \$10,000 per million. Of the second class the costs varied from \$114 to \$20,000; 17 of the 33 cost less than \$1,000, and 12 cost between \$1,000 and \$10,000 per million. Of the third class the costs ranged from \$78 to \$2,890; 6 were between \$100 and \$200, 9 between \$200 and \$1,000 and 7 \$1,000 or over. In class four the costs ranged from \$5 to \$2,953; 6 were less than \$100, 14 between \$100 and \$1,000 and four more than \$1,000. Of the largest class the costs ranged from \$24 to \$2,775. Five were less than \$100 and eight between \$100 and \$500 with only one larger than \$500.

Such wide variations show quite plainly that averages are of no assistance whatever in estimating beforehand what would be the cost of storage in a given case.

COST OF GAS PLANTS

MUNICIPAL JOURNAL AND ENGINEER, New York.

GENTLEMEN:—I have noticed some very interesting data in some of your recent issues concerning the cost and operation of gas plants. However, they do not quite cover the point I want to reach.

I wish to make use of your statement regarding inquiries by mail. I am interested in the cost of erection, cost of maintaining, cost of operation, and the probable consumption of gas in a town of 3,000 to 5,000, where the gas will probably be used for individual lighting and more especially heating purposes. In all probabilities no street lighting.

What is the best size of plant and the best method to employ?

Anything you can furnish me covering the above questions will be very much appreciated by the writer. Most information at hand is for conditions in larger places.

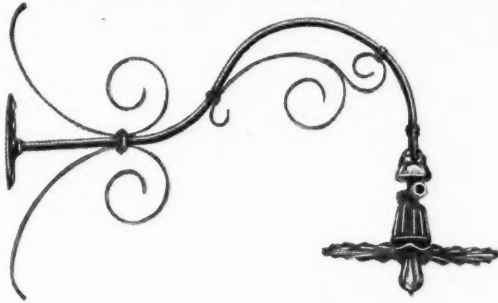
Very truly yours, A. E. MILLER.

Will not some of our readers who possess this information concerning individual plants or groups of plants contribute to the answer of this question?

MUNICIPAL APPLIANCES

TUNGSTEN STREET LAMPS

THE General Electric Company, Schenectady, N. Y., has placed on the market series incandescent street lamps which will enable cities to adopt the ideal system of illumination, that of low units of intensity distributed at frequent intervals. The adoption of this system has been handicapped in the past by the relatively low efficiency of the available lamps, but since the introduction of series tungsten lamps this objection no longer exists. The tungsten series lamp is furnished in 32, 40 and 60-candlepower units, adapted for 4, 5.5, 6.6 and 7.5 ampere ranges, with an efficiency of $1\frac{1}{4}$ watts per candlepower. For street lighting the bracket shown in the cut is supplied with one radial



STREET BRACKET—TUNGSTEN LAMP

reflector, which is so designed as to increase the effective candlepower of the lamps about 20 per cent., and to distribute the light in the most useful direction. The reflector is made of a stamped, fluted steel disk, the under side of which is finished with white enamel and presents an attractive appearance, is durable and affords the lamp protection.

HIGH DUTY TURBINE PUMP

THE general design of the Lea-Degen pump consists essentially of two shrouded runners, or pump wheels, mounted on the same shaft in a double case. The case is so partitioned that the water is drawn from the source of supply and put under pressure by the first wheel, and then delivered to the suction chamber of the second wheel. The second wheel then imparts to the water the same amount of energy it receives from the first wheel, thereby increasing the pressure, and then delivers the water into a spiral discharge conduit terminating in a diverging nozzle connecting with the main pipe.

The special advantages of the pump patented are:

The case is divided horizontally to afford easy access to the internal parts.

It is so constructed that additional stages may be added without wasting any part of the existing case.

An arrangement of double cup-leather packing, with a spring between each pair of cup leathers, bearing against a flat collar on extended pump wheel sleeves make a water-tight point at all times.

On the outside of main bearings at each end is placed a ball thrust bearing, with adjustable collars, for shifting the shaft endways to balance the end thrust of the pump runners.

A series of tests made by Prof. J. E. Denton showed remarkably uniform high efficiency under varying conditions. At 400 revolutions, 43.6 ft. lift, 2,296 gallons capacity, the efficiency was 77.7 per cent.; at 600 revolutions, 100.7-ft. lift, 3,235 gallons capacity, the efficiency was 77.97 per cent. The pump is manufactured by the Lea Equipment Company, 136 Liberty street, New York, N. Y.

ONE-CAR ASPHALT PLANT

ALTHOUGH portable railroad asphalt plants have been on the market for many years, they have not displaced stationary plants to the extent that inventors thought they might, owing largely to the cost of wrecking them and setting them up again in the new location. The use of two cars for their construction has always tempted designers to erect heavy structures between the two cars, using them in part for foundation and support, a proceeding which, unobjectionable when the plant is in operation, costs money to put up and take down. The plant placed on the market by the East Iron & Machine Company, Lima, O., designed by George Merriman, Toledo, O., who has built and operated asphalt plants for a quarter of a century, overcomes the objection referred to, and is built on a single car. Owing to this fact and other conveniences of design, the plant can be erected, the manufacturer assures us, in five hours' time at a labor expense of \$20. With the old-style plants \$100 was the least sum allowed for this work, and two or three days' time, and it required good luck and an experienced force to keep within that estimate. The capacity of the plant is rated at 1,800 square yards of 2-in. topping and 4,000 square yards of binder for a day's work. The record of work of a plant operated by the Andrews Asphalt Company during the season of 1907, a total of 114,000 square yards in six cities, shows what the capacity of the plant is under working conditions. The amount of work done in the different cities was as follows:

From May 22, 1907, to December 25, 1907, Hamilton, O., 43,000 sq. yds.; Green Bay, Wis., 22,000 sq. yds.; Dayton, O., 13,000 sq. yds.; Piqua, O., 25,000 sq. yds.; Findlay, O., 5,500 sq. yds.; Lima, O., 5,500 sq. yds. Total finished work, 114,000 sq. yds.

The following details regarding the plant may be of interest: Length, 65 ft.; side sills, 24 in.; I-beams, 100 lb. to ft.; 2-in. truss rods, 100-ton capacity trucks. Patent couplers, Westinghouse Air Brake independent on both ends, and passes all requirements of railroads in height and width. Does not require special track to operate on. The mixer is strong and has sufficient power and it is not necessary to make any change in blades for the two different materials, viz., top and binder. This plant is equipped with 125-h.-p. return flue Marine boiler, tested at 260-lb. cold water test on which 160-lb. steam may be carried. There is an independent engine driving drum and cold sand elevators. Men can feed from both sides of plant at same time if necessary; there is an independent engine driving hot sand elevator and screen. One 24-h.-p. engine driving mixer direct; one small rotary engine for hoisting material to plant. The plant is equipped with two A. C. tanks, each having 1,500 ft. of $1\frac{1}{4}$ double-strength endless coils; no connection in tank to leak, all being electrically welded. These tanks have capacity of 37,000-lb. each and carry air pressure of 10-lb., which is supplied from large air compressors. The condensed steam from A. C. tank returns to boiler by means of a hot water pump working automatically, requiring no attention whatever. The sand drum is 28-ft. long, 5 ft. 6 in. in diameter, has four very heavy spiders on inside, weighing 1,800 pounds each and 9-in. shaft. This is a return heat drum, the heat passing under and returning through the drum, has flights inside for conveying sand through, and is in every way a very strong drum. The hot sand tank, screen mixer and a mixer engine, hoisting engine, elevator engine and all, are on sliding carriage constructed on one end of plant which is slid out in position to drive under by means of two large screws. The hot sand tank is raised by right and left screws on each corner; this saves removing tank from car, which leaves it always in position. In the construction of the plant the best of steel is used on all gears.



Asphalt Plant on One Railroad Car

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals

ROADS AND PAVEMENTS

Good Roads. Story of a Remarkable Propaganda. History of the good roads movement. Quotations from discussion by Ira O. Baker, in Proceedings of the American Society of Civil Engineers. 1 1-2 pp., Engineering News, October 15.

English Macadam, The Alleged Superiority of, Criticism of Engineering News Explanation of. 2-3 p., Engineering-Contracting, Oct. 7.

Automobiles, Effect of on Macadam Roads. Address before the Buffalo Legislative and Good Roads Convention. By L. W. Page. Ill., 3 pp., Municipal Engineering, October.

Maintenance of Highways in View of the Advent of the Motor Vehicle. Paper presented at the International Roads Congress at Paris. By Clifford Richardson. Ill., 2 1-2 pp., Engineering Record, Oct. 17.

Modern Road Management. Paper read before the International Road Congress. By E. Purnell Hooley. 2 pp., Surveyor, Oct. 16.

Road Improvements and Resurfacing Experiments. By Harold A. Hosking. 2 pp., Surveyor, Oct. 2.

Reinforced Concrete Stone Bins and Trestle. Details of structure for the Street Department, Springfield, Mass. Ill., 1 p., Engineering-Contracting, Oct. 14. Ill., 2 pp., Municipal Journal and Engineer, Oct. 14.

Improvements for Worcester. Account of gravel beds, storage yard and trolley distribution system. 3-4 p., Municipal Journal and Engineer, Oct. 14.

Dust Preventives: Oils, with Methods of Analysis and Suggested Specifications for Their Use. From Bulletin of U. S. Office of Public Roads. 3 pp., Engineering, Oct. 21.

Dust Preventives: Tars. Methods of Analysis and Suggested Specifications for Their Use. 2 1-2 pp., Engineering-Contracting, Oct. 14.

Selection of Dust Preventives. 3 pp., Engineering Record, Oct. 3.

Dust Laying in Barnsley. By J. Henry Taylor. 1 p., Surveyor, Oct. 2.

Oiled Sand Roads, Cost of in Massachusetts. 1-2 p., Engineering-Contracting, Oct. 7.

Oiled Roads of Santa Monica, Cal. By C. B. Irvine. Ill., 1 p., Municipal Engineering, October.

Road Tarring and Vegetation. Opinions of American and English engineers. 1 1-2 pp., Municipal Journal and Engineer, Oct. 28.

Road Tarring and Its Effect on Trees and Plants. The alleged damage in the Avenue du Mois de Boulogne 1 1-2 pp., The Surveyor, Sept. 11; 3 pp., Sept. 18; 3 pp., Sept. 25; 3-4 p., Oct. 29.

Road Tarring and Plant Life. Editorial. 1-2 p., Surveyor, Oct. 2.

Tarred Macadam. General Account of Its Use. By William Pierson Judson. 1 1-3 pp., Progressive Age, Oct. 15.

Tar and Asphalt Macadam. Methods and costs in Rhode Island. 2 1-2 pp., Engineering-Contracting, Oct. 7.

Mineral Rubber Road Surfacing. Account of asphaltic material laid on Chicago boulevard. Ill., 2 pp., Municipal Journal and Engineer, Oct. 21.

Petrolithic Roads. "Revolution in Road Building, Methods Now in Progress and the Place of John Fitzgerald in Highway History." 2-3 p., Engineering-Contracting, Oct. 21.

Asphalt Repair Plant, Toronto. 1-2 p., Municipal Journal and Engineer, Oct. 21.

Indianapolis Asphalt Plant. Ill., 1 p., Municipal Journal and Engineer, Oct. 28.

Cost of Repairing Asphalt Pavements. Data regarding contract prices and work of municipal repair plants. 1 1-2 pp., Municipal Engineering, October.

Wood Block Pavements. Account of the use of Karri and Jarrah block pavements in Manila. Ill., 1-2 p., Far Eastern Review, August.

Brick Street Pavements, Proper Construction of. Paper read before the American Society of Municipal Improvements. By Will P. Blair. Ill., 3 1-2 pp., Clay Worker, October.

Iron-slag Block for Street Paving Purposes. Comment on advantages and effects. 1 1-2 pp., Engineering News, Oct. 8.

Post Road, The Old Boston. Methods of travel and an account of road scenes a century ago. By Stanley M. Arthurs. Ill., 12 pp., Scribner's, November.

SEWERAGE AND SANITATION

Sewerage Work in Baltimore. Account of progress and methods of construction. Ill., 4 pp., Municipal Journal and Engineer, Oct. 21.

Recent Work in New Orleans. Account of the work of the Sewerage and Water Board. 2-3 p., Municipal Journal and Engineer, Oct. 7.

Milwaukee Sewerage Notes. 1-3 p., Municipal Journal and Engineer, Oct. 28.

Reinforced Concrete Block Sewer. By Burton Lowther. Ill., 3 pp., Cement Age, October.

Reinforced Concrete Sewer in Avenue A, Borough of the Bronx. Ill., 2 pp., Engineering Record, Oct. 3.

Large Concrete Sewer Constructed with Adjustable Metal Forms. Account of use of Durlite forms. By John M. Bruce. Ill., 2 pp., Engineering News, Oct. 8.

Brick Sewer. Cost of constructing in water soaked sand at Gary, Ind. 1 1-2 pp., Engineering-Contracting, Oct. 7.

Separating Basin, Sand and Gravel, in a Storm Water Sewer. Account of basin designed by L. W. Anderson. Ill., 1 p., Engineering Record, Oct. 24.

Stormwater Overflows, Contribution to the Calculation of. Overflows to streams from combined sewers. By Prof. Frühling. Ill.; and by Government Engineer T. Lutz. Ill., 3 pp., Gesundheits-Ingenieur, Oct. 17.

Intercepting Traps; Are They Necessary? By E. B. B. Newton. 2 pp., Surveyor, Sept. 18.

Sewage Disposal Works at Burslem (England). Ill., 2 pp., Contract Journal, Oct. 14.

Sewage Disposal at Maidenhead. Eng. By Jos. R. Barford. 1 1-2 pp., The Surveyor, Oct. 9.

Sewage Disposal in Columbus, O.

Ill., 5 pp., Municipal Engineering, October.

Water Supply and Sewage Disposal at Home and in South Africa. From a paper read before the Royal Sanitary Institute. By R. O. Wynne-Roberts. 1 1-2 pp., Water, Oct. 15.

Drying Sewage Sludge in Centrifugal Machines. An account of German practice. 2-3 p., Engineering Record, Oct. 17.

Filters, Relative Action of Sand, Contact and Sprinkling, on Organic Matter. Data compiled by W. H. Clark from records of the Lawrence Experiment Station. 1 p., Engineering Record, Oct. 24.

Cameron Septic Tank Patent. Status of the patent controversy. Abstract from Municipal Journal and Engineer. 2 pp., Midland Municipalities, October.

Hampton Interpretation of the Operation of Sewage Purification. Statement of the theory of the purification process. By George Louis Travis. 2 pp., Contractors' Journal, Sept. 30.

Biolysis of Sewage, Some Recent Experiments on the. From a paper read at the Sanitary Congress, Cardiff. By W. D. Scott-Moncrieff. 1 1-2 pp., Water, Oct. 15.

Sewage Problem, Incongruities of the. Paper read before the Association of Managers of Sewage Disposal Works. By W. D. Scott-Moncrieff. 2 1-2 pp., The Surveyor, Oct. 9.

Royal Commissioners' Fifth Report on Sewage Disposal. Purification of sewage by artificial filters. A review by H. C. H. Shenton. 3 pp., The Surveyor, Oct. 2; 3 pp., Oct. 9.

Royal Commission on Sewage Disposal. Summary of conclusions and recommendations of Fifth Report. 2 1-2 pp., Surveyor, Sept. 11.

Royal Commission on Sewage Disposal. Summary of conclusions and recommendations of Fifth Report. 3 pp., Water, October.

Royal Commission on Sewage Disposal. Extracts from the Fifth Report. 3 pp., Journal of the Royal Institute of Public Health, October.

Royal Commission on Sewage Disposal. Notes on the Fifth Report. By Hugh S. Watson. 1 p., Contract Journal, Sept. 23; 2-3 p., Oct. 7; 1 p., Oct. 14.

Latest Phase of the Sewage Question. Comment on the Fifth Report of the Royal Commission. 2-3 p., Local Government Journal, Oct. 10; 2-3 p., Oct. 17.

British Royal Commission on Sewage Disposal. Fifth Report. 1 1-2 pp., Engineering News, Oct. 8.

Sewage Disposal in England. Abstract and comments on the Fifth Report of the Royal Commission. 4 pp., Municipal Journal and Engineer, Oct. 7.

Sanitation, Liverpool's; Disease Carriers. Presidential address delivered before the Sanitary Inspectors' Association. By Sir James Crichton-Browne. 3 pp., Contractors' Journal, Sept. 30.

House Flies, Biology of in Relation to the Public Health. Paper read before the Royal Institute of Public Health. By C. Gordon Hewitt. Ill., 12 pp., Journal of the Royal Institute of Public Health, October.

Typhoid Fever, Transmission of. Abstract from paper before Indiana San-

itary and Water Supply Association. By H. E. Jordan. 3 pp., Municipal Engineering, October.

Care of Milk in the Home. Paper by E. C. Levy. 1 p., Bulletin Indiana State Board of Health, August.

Unsuspected Source of Typhoid. 1-3 p., Municipal Journal and Engineer, Oct. 28.

Public Health, Municipal Engineers and. Paper read before the Ideal Home Exhibition. By Harold G. Turner. 2-3 p., Contract Journal, Oct. 14.

The Health of Havana. 1 p., Revista Municipal, Oct. 1.

Disinfectants, Standardizing of. Presidential address to the Section of Bacteriology and Chemistry of the Royal Institute of Public Health. By S. Delepine. 18 pp., Journal of the Royal Institute of Public Health, October.

WATER SUPPLY

Water Works of Cleveland. Account based on the 1907 report of the water works division, Board of Public Service. Ill., 4 1-2 pp., Municipal Journal and Engineer, Oct. 14.

Cincinnati Water Works. Review of the construction of plant recently completed. Ill., 1 p., Fire and Water, Oct. 14.

Water System of Washington, Pa. Ill., 2-3 p., Fire and Water Engineering, Oct. 21.

Birmingham (England) Water Works. Abstract of Antony Lee's monograph on the Elan Valley undertaking. Ill., 2 pp., Municipal Journal, Oct. 2.

Water Supply, The Breslau Artesian. Comments on its purification. 8 pp., Gesundheits Ingenieur, Oct. 3.

Condition of Indiana Water Supplies. By Dr. H. A. Barnard, chemist in charge of State Board of Health Laboratory. 2 pp., Municipal Engineering, October.

Struggle for Water in the Great Cities of the United States. By Marsden Manson. 15 pp., California Journal of Technology, September.

Collection of Water by Galleries at the Richmond, Ind., Water Works. Paper read before the Indiana Water and Public Health Association. By Howard C. Dill. 1-2 p., Water and Gas Review, October.

Sinking and Tubbing a Well at Altram Bridge Pumping Station, near Accrington, England. Detailed description of process. Ill., 4 pp., Water, October.

Infiltration Plant Under Construction at Ironton, O. By Phillip Burgess. 1 1-2 pp., Engineering Record, Oct. 17.

Construction of Buffalo Water Works Improvements. Account of the progress of construction. Ill., 4 pp., Engineering Record, Oct. 10.

Blue Island Avenue Tunnel of the Chicago Water Works. Detailed description. Ill., 2 pp., Engineering News, Oct. 22.

Pumping Plant at Thirty-ninth Street Station, Chicago. Ill., 1 p., Fire and Water, Sept. 30.

New York City's High Pressure Pumping station. Popular description. Ill., 4 pp., Edison Monthly, October.

Reservoir, Reinforced Concrete Covered for Indianapolis Water Co. By William Curtis Mabree. Ill., 1 1-2 pp., Engineering News, Oct. 15.

Proposed Reservoir System in Ohio Basin. Review of paper by M. O. Layton submitted to Inland Waterways Commission. By H. C. Newcomer. Ill., 4 1-2 pp., Engineering News, Oct. 8.

Flood Water Channel and Reservoir

Inlet. Account of water works improvements at Altoona, Pa. Ill., 2 pp., Municipal Engineering, October.

Forests, Reservoirs and River Improvements. Paper by Lieut.-Col. H. M. Chittenden before the American Society of Civil Engineers. 2 1-2 pp., Engineering Record, Oct. 24.

Dams, Masonry, Formulae and Theory. By Fred C. Urin. Ill., 1 1-2 pp., Contractors' Journal, Sept. 30.

Rubble Concrete Dam. Method and cost of constructing. 1 1-2 pp., Engineering-Contracting, Oct. 7.

Development of Practical Type of Concrete Spillway Dam. By Richard Muller. Ill., 2 pp., Engineering Record, Oct. 24.

Construction on the Pathfinder Dam, North Platte Project, U. S. Reclamation Service. By E. H. Baldwin. Ill., 3 pp., Engineering News, Oct. 29.

Water Tank, Renewing Foundation of a. By Wm. Martin. Ill., 1 1-2 pp., Municipal Journal and Engineer, Oct. 21.

Day Labor Work. Account of a suit to prevent Los Angeles from building the Owens river aqueduct by day labor. 1-2 p., Engineering-Contracting, Oct. 14.

Level Operations, Precise, on the Los Angeles Aqueduct. By Chas. H. Lee. Ill., 2 pp., Engineering News, Sept. 17.

Bench Leveling for the Board of Water Supply, New York. Ill., 3 pp., Engineering Record, Oct. 3.

Pipe Cleaning Apparatus, French. Ill., 1 p., Municipal Journal and Engineer, Oct. 28.

Cleaning Pittsburg Water Mains. Paper read before the Central Water Works Association. By C. O. Daughaday. 1 p., Municipal Journal and Engineer, Oct. 14; 2-3 p., Fire and Water, Oct. 14; 1 p., Water and Gas Review, October; Engineering-Contracting, Oct. 7.

Filtering Ohio River Water, Experience of Small Water Works in. By Arthur Schofield. 2-3 p., Fire and Water Engineering, Oct. 21.

Experience with Mechanical Filters at Benwood, W. Va. 1-3 p., Engineering Record, Oct. 17.

McKeesport Filtration System. Address delivered before the Central States Water Works Association. By Alex. Potter. 3-4 p., Fire and Water Engineering, Oct. 14.

Lawrence Filter Beds. A short account. By Arthur D. Marble. 2-3 p., Fire and Water, Oct. 14.

Gaultier System of Sand Filtration. Ill., 2 1-2 pp., La Technique Sanitaire, October.

Dye Water, Purification of. Attempt to restore the purity of English rivers. By Deputy Consul R. D. Nichols. 3-4 p., Daily Consular Report, Oct. 3.

Ozone Treatment of Croton Water, New York City, Experiments on the. Letter from L. R. De la Mahotiere, City, Eng., Mangkoka, Siam, with comments by I. M. de Verona. 2-3 p., Engineering News, Sept. 17.

Water Purification Plants, The Engineer and. Paper read at the Convention of the Central States Water Works Association. By F. B. Leopold. 1 p., Fire and Water, Oct. 14.

Sanitary Laws, Value of, in Their Protection of Water Supplies. By R. Winthrop Pratt. 2-3 p., Fire and Water, Oct. 14; Water and Gas Review, October.

Insurance Rates, Water Service and. Abstract of paper read before New England Water Works Association. By F. A. Barbour. 1-2 p., Engineering News, Oct. 1.

STREET LIGHTING AND ELECTRIC POWER

Street Lighting in Chicago. Account from the annual report of the Department of Electricity. Ill., 1 1/2 pp., Municipal Journal and Engineer, Oct. 7.

Street Lighting in Brooklyn. By H. Thurston Owens. Ill., 2 pp., Progressive Age, Oct. 15.

Comparison of Three Notable Street Lighting Systems. Comparison of lighting of streets in Minneapolis, Grand Rapids and Toledo. Ill., 1 1/2 pp., Electrical World, Oct. 3.

Street Lighting. Fixtures and Illuminants. Paper read before the Illuminating Engineering Society. By H. Thurston Owens. Ill., 1 1/2 pp., American Gas Light Journal, Oct. 26; 3 pp., Illuminating Engineering, October.

American and European Street Lighting. Address before the Illuminating Engineering Society. By Dr. Louis Bell. 1 p., Electrical World, Oct. 3.

Electric Street Lighting. Comparative statements of costs in Massachusetts cities. By Wm. L. Puffer. 1 1/2 pp., Municipal Journal and Engineer, Oct. 7.

Ornamental and Boulevard Lighting, Developments in. Description of the Daniels Boulevard Lighting System. By Chas. L. Eshleman. Ill., 2 pp., Illuminating Engineer, September.

Park Lighting System of Portland, Ore. Account of recent improvements. By B. C. Coldwell. 1 p., Municipal Engineering, October.

Acetylene Town Lighting. Paper read before the International Acetylene Association. 1 p., Progressive Age, Oct. 1.

Bureau of Lamps and Lighting, New York City. Abstract of Annual Report of 1906. 1/2 p., American Gas Light Journal, Oct. 5.

Winnipeg Electrical Department. Condensed from annual report of F. A. Cambridge. 1 1/2 pp., Canadian Municipal Journal, October.

Corporation Regulation. Special reference to the situation in California. Paper read before the Pacific Coast Gas Association. By John A. Britton. 1 p., American Gas Light Journal, Oct. 19.

Rules and Regulations Regarding Gas Service. Wisconsin Utilities Commission. 5 pp., Midland Municipalities, October.

Standards for Gas and Electric Service. Rules adopted by the Wisconsin Railroad Commission. 2/3 p., Engineering News, Oct. 8.

Intrinsic Brightness of Lighting Sources. Abstract of paper read before the Illuminating Engineering Society. By J. E. Woodwell. 2 pp., Electrical Review, Oct. 24.

Mantles for Gas Lights. 1-3 p., Municipal Journal and Engineer, Oct. 7.

Illuminating Gas at Sixty Cents for Indianapolis. Account of the franchise of the Citizens' Company. 1 p., Engineering Record, Oct. 17; Progressive Age, Oct. 15.

Municipal Light and Water Plant. Account of the plant at Walker, Minn. 1/3 p., Municipal Journal and Engineer, Oct. 14.

Columbus Municipal Lighting Plant. Description and account of operation. By G. H. Gamper. 9 pp., Municipal Journal and Engineer, Oct. 7.

Public Utilities at Santa Clara, Cal. Annual report, showing profit of water,

gas and electric works. 1 p., Pacific Municipalities, September.

Oil-burning Steam Power Plant, A 15,000 k.w. Account of the Pacific Light & Power Company plant at Redondo, Cal., on which a bonus of \$363,310 was earned. Ill., 2½ pp., Engineering News, Sept. 17.

Water Powers in Europe. Development and control in Switzerland. By Vice-Consul Leo T. Frankenthal. 4 pp., Daily Consular Reports, Oct. 26.

Power Contracts, Municipal Hydro-electric. Discussion of provisions of contract. 1 p., Engineering Record, Oct. 10.

Valuation of Electric Plants. Different methods used in determination. ½ p., Engineering Record, Oct. 3.

Electrolysis in New Bedford. From the annual report of R. C. P. Coggeshall. Ill., 1 p., Water and Gas Review, October.

FIRE AND POLICE

Fire Prevention. Paper read before the convention of fire chiefs, Columbus, O. By F. W. Fitzpatrick. 4 pp., Midland Municipalities, October.

Fire, An American Extravagance. A popular plea for building reform. By F. W. Fitzpatrick. Ill., 7 pp., McClure's Magazine, November.

Fire Alarm Boxes, Proper Distribution of, and the best method of educating the people to use them effectively. Paper read before the International Association of Fire Engineers, Columbus. By John J. McMahon. 1 p., Fire and Water, Oct. 7.

Education in Use of Fire Alarm Boxes. 1½ pp., Fireman's Herald, Oct. 10.

Conflagration, New Orleans. Report of the Louisiana Fire Prevention Bureau on the million dollar fire of Aug. 30. Ill., 14 pp., Insurance Engineering, October.

Augusta Flood and Fire. Ill., 9 pp., Insurance Engineering, October.

Hose Question, Phases of the. Discussion of the causes of hose bursting. By F. W. Shepperd. ½ p., Fire and Water, Oct. 7.

Fire Engine, Centrifugal Pump. Account of the Dennis auto-fire engine. Ill., 2 pp., Contract Journal, Oct. 7.

Interurban Assistance in Case of Conflagrations. Paper read at the Massachusetts State Firemen's Association. By J. A. Mullen. 1 p., Fire and Water, Oct. 7; 2 pp., Fireman's Herald, Oct. 3.

Paid and Volunteer Firemen, Friendship and Co-operation Between, in State and national associations. Paper read before the National Firemen's Association. By Guy Northrup. ½ p., Fire and Water Engineering, Oct. 21.

Firemen's Benefit Laws. Paper read at the National Firemen's Association. By John M. Sherwood. 1 p., Fireman's Herald, Oct. 24.

Government of Fire Departments, Model Metropolitan Non-partisan Law for the. Paper read at the annual convention of the International Association of Fire Engineers, Columbus. By J. R. Cantebury. 1 p., Fire and Water, Sept. 30.

GOVERNMENT AND FINANCE

Municipal Government in Massachusetts, Cost of. By Don E. Mowry. ¾ p., Municipal Journal and Engineer, Oct. 14.

Forward Citizens to the Firing Line. Comment and suggestions on municipal government. By Chas. Edward Russell. 9 pp., Everybody's Magazine, November.

Ideal Government of the Capital of Vermont under Direct Legislation. By C. A. G. Jackson. 1 p., Arena, October.

Commission Government, Finances Under. By Chas. Mulford Robinson. 2/3 p., Municipal Journal and Engineer, Oct. 28.

Board of Control, Ottawa's. Paper read before the Union of Canadian Municipalities. By Mayor D'Arcy Scott. 1½ pp., Canadian Municipal Journal, October.

Winnipeg Board of Control. Paper read before the Union of Canadian Municipalities. By Mayor Ashdown. 1½ pp., Canadian Municipal Journal, October.

Toronto's Board of Control. Paper read before the Union of Canadian Municipalities. By Comptroller Ward. 1½ pp., Canadian Municipal Journal, October.

Moving Picture Show Regulations. Norfolk, Va., ordinance. 1-4 p., Municipal Journal and Engineer, Oct. 7.

Business Methods versus Politics. Comments on the management of the Street Cleaning Department, Richmond Borough, N. Y. ½ p., Municipal Journal and Engineer, Oct. 7.

Municipal Accounting, Uniform. Paper read before the Union of Canadian Municipalities. By H. J. Ross. 1½ pp., Canadian Municipal Journal, October.

Municipal Finance, Points in. Address before the Conference of Incorporated Accountants. By John Allcock. 1 p., Municipal Journal, Oct. 2.

Bond Sales During August, Municipal. 1¼ pp., Municipal Journal and Engineer, Oct. 7.

Sinking Funds. Paper read before Union of Canadian Municipalities. By Mayor Rush. 1 p., Canadian Municipal Journal, October.

Taxation, The Incidence of. Discussion of question as to who pays different kinds of taxes. By A. C. Pleydell. 2 pp., Western Municipal News, October.

STREET CLEANING

AND REFUSE DISPOSAL

City Refuse and Its Disposal. General account, with special reference to New York City. 8 pp., Chemical Engineer, September.

Refuse Destructor, Operating Results of the Seattle. 1-3 p., Engineering Record, Oct. 17.

Refuse Destructor at West New Brighton. Ill., 3 1-2 pp., Engineering Record, Oct. 3.

Investigation of Combustion of Different Kinds of Waste in the Dörr Garbage Destructor. Data from four German cities. 3 pp., Gesundheits-Ingenieur, Oct. 17.

TRAFFIC AND

TRANSPORTATION

Traffic, Chaos of London. Review of article in Nineteenth Century. 1-2 p., Contract Journal, Oct. 14.

Traffic Problems of Interurban Electric Railroads. By Thomas Conway, Jr. 9 pp., Journal of Accountancy, October.

Speed Regulations of Street Cars in Great Britain. By Consul F. W. Mahan. 1-2 p., Daily Consular Reports, Oct. 22.

Track Depression on the Seaboard Airline Railway, Birmingham, Ala. Detailed description and method of construction. By Phillip Aylett. Ill., 4 pp., Engineering News, Oct. 1.

Construction, Standards of Track. Comparison of methods employed in a

number of cities. Ill., 9 pp., Electric Railway Journal, Oct. 10.

Permanent Underpinning for the Paris Subway of the Paris and Orleans Ry. Ill., 1 p., Engineering News, Oct. 15.

Raising the Chicago and Oak Park Elevated Ry., Chicago. Ill., 2 pp., Engineering News, Oct. 29.

Underground Tube, Buenos Aires. New plan proposed by leading Argentine Congressman. By Consul-General A. G. Snyder. 3-4 p., Daily Consular Reports, Oct. 12.

Paris Metropolitan. Extensions to the subway system in the French capital. Ill., 3 pp., Electrical Review, Oct. 10.

Freight Subway Belt Line, Proposed, for Lower New York City. Abstract of report presented to the Public Service Commission by W. J. Wilgus. Ill., 3 pp., Engineering News, Oct. 15; editorial comment on this plan; 2-3 p., Engineering News, Oct. 15.

Carrying Freight and Express Matter. An account of the progress by trolley roads to date, with some mistakes that have been made and their remedy. By C. V. Wood. 5 pp., Electric Railway Journal, Oct. 15.

Joint Rates and Through Routes, Proposed, in New York City. Hearing before the Public Service Commission. Testimony of Oren Root. 2 pp., Electric Railway Journal, Oct. 3.

Testimony of Charles F. Nebelacher before the Public Service Commission, tending to show that the Metropolitan Street Railway Company would lose more money as traffic increased. 2 1-2 pp., Electric Railway Journal, Oct. 31.

Tramway Conference. Abstract of three papers read at the Nottingham Conference of the Municipal Tramways Association. 3 pp., Municipal Journal, Oct. 2.

Municipal Board, Ontario Railway and. Paper read before Union of Canadian Municipalities. By J. J. Ward. 1 1-2 pp., Canadian Municipal Journal, October.

Municipal Street Cars of Monroe, La. By Ernest S. Bradford. Ill., 2 pp., Municipal Journal and Engineer, Oct. 21.

Street Railways in China. By Vice-Consul-General F. D. Cloud. Daily Consular Reports, Oct. 22.

Philadelphia Subway and Elevated Railroad. By J. A. Stewart. Ill., 3 pp., Municipal Engineering, October.

Land Values and Transit Facilities. A proposition to build subways on the assessment plan. 1-2 p., Municipal Journal and Engineer, Oct. 14.

Motor Omnibuses, Gaso-Electric, on Fifth Avenue, New York City. By H. S. Baldwin. Ill., 7 pp., General Electric Review.

MISCELLANEOUS

Public Improvements of Quito, Ecuador. By Consul-General Herman R. Dietrich. 2 pp., Daily Consular Reports, Oct. 23.

Salt Lake City's Public Utilities. Ill., 2 pp., Municipal Journal and Engineer, Oct. 28.

Descriptions of Cities. New York a Hundred Years Ago. Extracts from a diary of an English merchant, who visited America in 1809. Ill., 10 pp., Munsey's Magazine, November.

The Guildhall in Norwich. By Arthur E. Collins. Ill., 3 pp., Contractors' Journal, Sept. 30.

Washington, Our Beautiful Capital—Its Seamy Side. Comment on lack of

improvements in some portions of Washington and the failure of the Government to deal with public service corporations in a satisfactory way. By Judson C. Welliver. Ill., 7 pp., Munsey's Magazine, November.

City Planning, German. By Cornelius Curlett. Ill., 14 pp., Architectural Record, November.

Improvements for Suburban Towns. Account of work at Ridgewood, N. J. Ill., 1 1-2 pp., Municipal Journal and Engineer, Oct. 28.

Civic Spirit and City Planning in Grand Rapids. By John Ihlder. 2 pp., Charities and Commons, Oct. 24.

Housing and Town Planning Bill. The requirements of Scotland. By F. G. Holmes. 2 pp., Surveyor, Sept. 18.

Housing Progress. Various examples of town planning, including gold medal plan at the South Wales Exhibition. By Henry R. Aldrich. Ill., 1 p., Municipal Journal, Oct. 9.

Workmen's Homes in Genoa. Houses for wage earners to be erected by the municipality. By Vice-Consul-General R. D. Birch. 3-4 p., U. S. Consular Reports, Oct. 13.

Street Signs Which Are Good and Some Poor Ones. Ill., 1 p., Suburban Life, November.

Billboards and Advertising Monstrosities. Paper read before Union of Canadian Municipalities. By Mayor Steverly. 1 p., Canadian Municipal Journal, October.

Bridge Architecture. Foreign and American bridges considered from an artistic standpoint. 1 1-2 pp., Engineering Record, Oct. 3.

Masonry Arch Bridge Across the Connecticut River at Hartford. Ill., 1 p., Engineering News, Oct. 22.

Reinforced Concrete Bridges. Description of a number of bridges in the United States. Ill., 16 pp., Concrete Review, October.

Combined Concrete and Steel Girder Bridge, Monroe Street, Brookland, D. C. Ill., 1 1-2 pp., Engineering News, Oct. 29.

Some Historic British Bridges. General description. Ill., 3 pp., Engineering News, Sept. 17.

Bridges of Grand Rapids, Mich. Ill., 1 p., Municipal Engineering, October.

Ashland Avenue Viaduct at Cincinnati. Detailed description and method of construction. Ill., 2 1-2 pp., Engineering Record, Oct. 17.

Harbor of Milwaukee, Wis., Improvement of the. Ill., 3 pp., Engineering Record, Oct. 24.

Reinforced Concrete Piers in Baltimore Harbor. Detailed description. Ill., 3-4 p., Engineering News, Oct. 1.

Slipping Land Surfaces. 1-2 p., Municipal Journal and Engineer, Oct. 21.

Abattoir, Municipal, in South Africa. By R. A. Webster. 1 p., Municipal Engineering, October.

Cement, Commercial Value of Fine Grinding of. Discussion and series of tests. Paper read before the American Society for Testing Materials. By Richard K. Meade. 2 1-2 pp., Engineering-Contracting, Sept. 30.

Commercial Value of Fine Grinding of Portland Cement. Letter from Ira A. Williams giving series of tests. 1 1-2 pp., Engineering-Contracting, Oct. 14.

Decomposition of Cement by Sea Water. Abstract of paper by M. H. Le Chatelier before the International Association for Testing Materials. By A. Vincent Elsdon. 1 1-2 pp., Water, October.

Temperature Observations in Masonry, Results of. Observations on the

dam at Boonton, N. J. 1-2 p., Engineering-Contracting, Sept. 30.

Cast Stone Used by Milwaukee Park Commission. Ill., 2 pp., Concrete, October.

Fuels Purchased Under Inspection and Analysis. Abstract of paper read before Philadelphia Foundryman's Association. By Wm. S. Gould. 3-4 p., Iron Age, Oct. 15.

Flood Prevention Problem. Review of paper by Lieut.-Col. H. M. Chittenden before the American Society of Civil Engineers. 1-2 p., Engineering Record, Oct. 24.

Contracts, Time Penalties on. Paper read before the annual convention of the American Public Works Association. By George A. King. 3 pp., Engineering Record, Oct. 3; Engineering-Contracting, Oct. 7.

Loose Specifications and Dishonest Contracts. 2-3 p., Engineering News, Oct. 1.

Systematizing a Contractor's Office. Paper read before the American Public Works Association. By Frank B. Gilbreth. 2 pp., Engineering-Contracting, Oct. 21.

Municipal Publicity through Uniformity in Municipal Statistics. Paper read before Union of Canadian Municipalities. By S. Morley Wickett. 2 1-2 pp., Canadian Municipal Journal, October.

Statistics, Discussion of Massachusetts. By Alton D. Adams. 3 pp., Municipal Journal and Engineer, Oct. 7.

Libraries, Municipal Reference. By Don E. Mowry. 2 pp., City Hall, October.

Convention, American Society of Municipal Improvements. 3 pp., Municipal Journal and Engineer, Oct. 28.

BOOK REVIEWS

Cyclopedia of Civil Engineering. A general reference work covering the field of modern engineering achievement. For the Civil, Structural, Railroad, Sanitary, Irrigation, Hydraulic, and Hydro-Electric Engineer. Prepared by a staff of practical experts of the highest professional standing. Editor-in-Chief, Prof. F. E. Turneaure, C. E., Dr. Eng., Dean of the College of Engineering, University of Wisconsin. 8 vols.; 4,000 pp., 8vo.; 3,000 illustrations. Indexed. Red half-morocco, gilt stamped, marbled edges. Price \$24. Published by the American School of Correspondence, Chicago, Ill. This colossal and most timely work is the first American reference work compiled covering the broad field of Civil Engineering, with all its far-reaching modern developments, and it is thoroughly representative of up-to-date engineering methods and achievement. A distinct necessity for such a work as this has been created by the marvelous engineering progress of recent years, as seen in the extension of railroad lines, the improvement of highways, waterways and other arteries of commerce; the increasing application of steel and reinforced concrete to construction work, the development of water power, as at Niagara and on the slopes of the Western Cordillera, and progress in many other directions.

The work as a whole bears evidence of being thorough in execution and broad in scope. It embraces not only the fundamentals that underlie all Civil Engineering, but their application to many types of mod-

ern engineering problems. It is especially designed for home study, as a means of self-help and self-instruction, but at the same time meets every demand of the trained expert, being, in fact, a compilation of regular instruction papers from the Civil Engineering Course of the American School of Correspondence. The subjects are exhaustively but concisely and clearly handled in simple language, free from abstruse formulae, and embellished with an unusual wealth of appropriate and attractive illustrations. A very complete system of indexes adds immeasurably to the value of the Cyclopedia as a work of ready reference. The volumes are beautiful examples of press-work, printed on high-grade paper, and very substantially bound. The list of authors and collaborators is itself a guarantee of the highest quality of work. Among the more prominent names we note that of Prof. F. E. Turneaure, of the University of Wisconsin, Editor-in-Chief and author of the sections on Water Supply and Hydraulics; Prof. A. E. Phillips, of Armour Institute of Technology, author of Plane Surveying and Irrigation Engineering, and joint author of Highway Construction; Walter Loring Webb, author of Masonry and Reinforced Concrete, Railroad Engineering, and Plotting and Topography; H. P. Gillette, joint author of Coast-Analysis Engineering; E. A. Tucker, author of Steel Construction; Prof. F. O. Dufour, of the University of Illinois, author of Bridge Engineering and Roof Trusses; Prof. A. Black, of Columbia University, author of Water-Power Development; Prof. C. E. Morrison, of Columbia University, author of River and Harbor Improvement; Prof. A. Marston, of Iowa State College, author of Sewers and Drains; and Charles B. Ball, Chief Sanitary Inspector of the City of Chicago, joint author of Plumbing and House Sanitation.

Cement Laboratory Manual. By L. A. Waterbury. New York: John Wiley & Sons. Cloth, 5x7 1/2 inches, 122 pp., 28 figures. Price \$1. The author, who is Professor of Civil Engineering, University of Arizona, has prepared this manual for the use of students taking the course in cement laboratory practice in the University of Illinois. The problems are suitable for class use and are not intended as instructions for testing cements for commercial purposes. Besides general instructions for laboratory work, description of apparatus and laboratory problems, there are contained in the appendix the progress report of the committee on uniform tests of the American Society of Civil Engineers, the American Society for Testing Materials, Specifications for Cement and the Society for Chemical Industry's Methods of Analysis of Limestones and Cements.

Edge's Weight Computer for Structural Shapes. Cardboard, 9 1/2 x 9 1/2. New York: The Edge Computer Sales Company. Price \$2. This small machine has been designed to compute the weights of all structural shapes of any length. It effects these calculations quickly, accurately and without the use of tables. It consists of two discs, one rotating on the other, each disc being marked with logarithmic scales representing the dimensions in feet and inches of the various shapes and results in pounds.

NEWS OF THE SOCIETIES

New England Water Works Association.—The November meeting of the Association will be held at Hotel Brunswick, Copley Square, Boston, Wednesday, November 11.

The programme follows:

10 o'clock—The headquarters in Tremont Temple building will be open for the use of members.

11:30 o'clock—Meeting of the Executive Committee at the Headquarters, Tremont Temple.

1 o'clock—Lunch will be served at Hotel Brunswick, Copley Square. Tickets, \$1.50, to be had at Headquarters during the morning and later at the hotel.

2 o'clock—The following papers will be presented: "Private Fire Protection and Insurance Rules," by Mr. Gorham Dana, Manager Underwriters' Bureau of New England, Boston, Mass. (Illustrated). "Public Water Supplies of the State of New York," by Dr. H. D. Pease, Director State Hygienic Laboratory, Albany, N. Y. Topical discussion.

The committee appointed to nominate officers for the ensuing year report the following list through John C. Whitney, Chairman:

For President—Robert J. Thomas, Superintendent Water Works, Lowell, Mass.

For Vice-presidents—George A. King, Superintendent Water Works, Taunton, Mass.; William F. Sullivan, Engineer and Superintendent Pennichuck Water Works, Nashua, N. H.; George A. Stacy, Superintendent Water Works, Marlboro, Mass.; Allen Hazen, Consulting Engineer, New York City; William C. Hawley, Chief Engineer and Superintendent Pennsylvania Water Company, Wilkesburg, Pa.; Ermon M. Peck, Engineer Board of Water Commissioners, Hartford, Conn.

For Additional Members of Executive Committee—George W. Batchelder, Water Commissioner, Worcester, Mass.; Frank L. Fuller, Civil Engineer, Boston, Mass.; Edmund W. Kent, Engineer and Superintendent Water Works, Newport, R. I.

For Secretary—Willard Kent, Manager Wakefield Water Company, Narragansett Pier, R. I.

For Treasurer—Lewis M. Bancroft, Superintendent Water Works, Reading, Mass.

For Editor—Richard K. Hale, Assistant Engineer with Robert Spurr Weston, Boston, Mass.

For Advertising Agent—Charles W. Sherman, Principal Assistant Engineer with Metcalf & Eddy, Boston, Mass.

For Finance Committee—George Cassell, Superintendent Water Works, Chelsea, Mass.; John C. Chase, Consulting Engineer, Derry Village, N. H.; Hugh McLean, Water Commissioner, Holyoke, Mass.

Western Society of Engineers.

During the discussion following the paper on Macadam Road Construction, read by Mr. A. N. Johnson, State Highway Engineer of Illinois, at the meeting of the Society, Oct. 21, several rather interesting points were brought out. For testing the cementitious properties of various stones, Mr. Johnson stated that the Department had devised some special tests. The material is ground to dust in a ball mill, sometimes wet and at others dry. For comparative results it is always ground wet. It is then formed into small cylindrical briquettes, which are tested under the light blows of an impact machine. The number of blows before disintegration occurs being a measure of the cementing value. While it is stated in the paper that clay or loam should be mixed with sandy soil to form a firm foundation this is sometimes impossible. In one case the sandy material was covered with cotton cloth for several miles to hold it in place for rolling and placing the first layer of stone. In other cases straw has been spread over the sand and this readily holds it in place. Another interesting part of the work of the commission has been their traffic census. For the last two years, four times each month, account has been

made of the vehicles passing along the road at 71 different points in the State. A well-traveled road is one which would have say, 300 vehicles passing in 24 hours, while one with 100 vehicles is well deserving of improvement. The cost of 12-foot macadam roads eight inches thick has been between \$5,000 and \$6,000 per mile. Such a road requires about 3,200 cu. yds. of material per mile and the labor cost, where the haul is not over a mile, is under \$2,000 per mile. This plus the cost of material will give the cost of the road. The repair on an ordinarily traveled road, when it is properly looked after, should not be much over \$50 per mile per year.

National Association of Cement Users.

The city of Cleveland, O., has been selected for the fifth annual convention, to be held during the week of January 11-16. The headquarters and meetings of the convention will be at the Hotel Hollenden, Superior Avenue and East Sixth Street. The Association has in contemplation a valuable series of papers, which will make the programme of the convention as highly attractive this year as it was last year. A number of reports of importance will come up for consideration, which will provide additional specifications, thus increasing the number already adopted. A large attendance is expected. The programme will not be available for some time, but the request contained in the last circular for suggestions as to subjects to be discussed, exhibition or other matters affecting the work of the Association, is repeated, and it is hoped that the members will communicate at once with the Association. The exhibition of cement products and appliances will be held at the Central Armory, which is about two blocks from the Convention Hall. This armory is admirably suited for the purpose, and although there is a very large amount of space available, it is certain that it will not be sufficient to meet the demand, judging from the inquiries already received. It is desirable, therefore, that all applications for space be mailed at once. Applications to be considered in the first allotment of space should be sent to the office of the Association, Harrison Building, Philadelphia, Pa.

Ohio State Board of Health.—The Sixth Annual Conference of the State Board of Health was held at Dayton, O., October 20-21. More than 300 delegates from the towns and hamlets of the southern part of the State, with the seven members of the State Board, were present at this conference, the business of the convention being pertaining to these towns only. The first session of the conference, Tuesday afternoon, was taken up in the reading of papers on "Observation Quarantine in Smallpox," by Dr. J. S. Wiltshire, township health officer, Gillespieville. "The Role of Insects in the Transmission of Disease," by Dr. Mark A. Brown, health officer, Cincinnati. "The Use of Abandoned Wells for Cesspools," by Dr. Frank E. Adams, health officer, Piqua. Discussion followed the read of each paper. At the session Wednesday evening, papers were read by Dr. L. G. Klepinger, Harrison township health officer, on "County Hospitals for Tuberculosis"; by Josiah Hartsell, member State Board, Canton, on "Stream Protection Under the Bense Act," and "Examination of Well Water in Typhoid Fever," by Dr. F. B. Sampson, Cincinnati. At the last session of the conference, Wednesday

morning, four papers were read, all pertaining to sanitary and health conditions in this part of the State. Dr. Charles A. Hough, member of the Lebanon Board of Health, read a paper on "The Growing Need for County Health Officers." "Expenses of Boards of Health" was the subject of a paper by Dr. W. A. Yinger, township health officer, Rosewood. Dr. A. W. Mardis, health officer of Lebanon, read a paper on "The Shortcomings of Township Boards of Health," and the health officer of Clifton, Dr. David E. Spahr, read a paper on "What Shall Be Done With the Slaughter House Nuisance?" A discussion by the delegates followed the reading of the papers, after which the question box was opened. As soon as these matters were disposed by the convention the conference was adjourned.

Arrangements were made for the township and village health officials of southern Ohio to meet at Cincinnati in October, 1909; the city board of health at Columbus, the third Wednesday in January, and the northern Ohio township and village officials at Toledo or Dayton in June, 1909.

American Society of Municipal Improvements.—Exhibition of Municipal Appliances. At the Atlantic City convention of this society an exhibition was given by a number of firms of materials and methods employed on city work.

Warren Brothers Company, of Boston, was represented by the president, George C. Warren, and exhibited a considerable number of samples of materials used in bitulithic pavements, together with sections cut from such pavements. Photographs and advertising literature were also found at their booth.

The Power Specialty Company, of 111 Broadway, New York, was represented by W. S. Gurnee, Jr., and E. Vail Stebbins. This company had set up a large model of a Heenan refuse destructor, which showed in great detail the various portions of a typical plant, including boilers, air compressors, etc.

The Lock Joint Pipe Company, of 346 Broadway, New York, was represented by Coleman Meriwether, president of the company. They had on exhibition a short length of 12-inch pipe, which was in reality a model of a larger size, showing their patented methods of connecting individual pipes and of placing a vitrified brick lining in the invert, which is made in and at the same time as the pipe.

The Kindling Machinery Company, of Milwaukee, was represented by James T. Bannen, of that city, and S. B. Whinery, of the New York office. Their exhibit was confined to photographs, a Squeegee street cleaner which they expected to exhibit not arriving in time for that purpose.

The Hassam Paving Company, of Winchester, Mass., was represented by C. A. Magill, of New Haven, Conn., and exhibited sections of Hassam pavement and photographs of work under construction, of special grouting machines and of other appliances used therein.

The National Paving Brick Manufacturers' Association, of Indianapolis, Ind., had on exhibition about seventy-five samples of paving brick and blocks, together with sections of pavement showing the adhesive qualities of cement filler. The association was ably represented by their corresponding secretary, Will P. Blair.

The Standard Asphalt and Rubber Company, of Chicago, which was represented by Mr. G. D. Carr, showed sam-

ples of Sarco goods, especially the asphalt used in the manufacture of mineral rubber roadways; also photographs of the construction of such roadways.

United States Wood Preserving Company, of 29 Broadway, New York, was represented by Alex. Reed and Newton Jackson. They exhibited wood blocks, both whole and broken in two, to show the penetration of the preservative. Two blocks were shown, which were removed from the pavement in Tremont street, Boston, which has been down nine years.

The Barrett Manufacturing Company, of 17 Battery place, New York, was represented by W. G. Bickell and F. S. Hutchinson. They displayed photographs and samples of goods.

The Reinforced Concrete Pipe Company, of Jackson, Mich., had on exhibition three large pipes of their manufacture, two of which were too large to be brought into the exhibition room, but were displayed on the sidewalk outside. The company was represented by B. F. Granger, in place of E. F. Lowry, the president and chairman of the committee on exhibits, who was unable to be present.

S. Cameron Corson showed an aluminum model of his patented storm water catch-basin and was present in person to explain its merits.

The Municipal Journal and Engineer distributed from its table copies of the paper and was represented by G. E. Sly, the business manager.

In addition to these, but having no special exhibits, were William H. Gilligan, representing the Newark Paving Company; G. H. Lutz, of the Equitable Asphalt Maintenance Company; H. A. Miner, president of the Steel Protected Concrete Company, manufacturers of Wainwright curb; R. H. Parker, of the United Paving Company of Atlantic City; W. B. Spencer, vice-president, and Harold B. Weaver, secretary of the Imperial Road Company of New York City; George O. Tenney, president of the Atlantic Bitulithic Paving Company of Richmond, Va.; Charles E. Guelich, of the Guelich Portable Asphalt Plant Company, 200 West Jackson boulevard, Chicago; T. E. Halpin, secretary of the A. P. Smith Manufacturing Company, of Newark, N. J.; Harry Tipper and W. S. Godwin, representing the Texas Company, of 17 Battery place, New York.

California Good Roads Association.—The first meeting of the Board of Directors of the California Good Roads Association, since its organization in Stockton on June 2, was held October 19 in the directors' room of the Chamber of Commerce. President Charles D. Daggett, of Pasadena, was in the chair, and J. M. Eddy, of Stockton, acted as secretary. J. M. Eddy, of Stockton, and P. J. Beverage, of Hollywood, were put on the board after the resignation of W. L. Greene, of Pasadena, and W. M. Bunker, of San Francisco. A resolution demanding attention and appropriations for good roads from Congress was passed. The matter of representation at the next meeting was considered, and it was determined that there should be one delegate for each affiliated good roads organization, and one delegate additional for each 100 membership in each over the first 100. Each Board of Supervisors is entitled to one delegate, and county highway commissioners will have three. After discussing at considerable length the advantage of changing the present State highway laws, it was agreed to leave the drafting of the proposed new laws to Dag-

gett, Ellery and Eddy. It is proposed to have created a State highway commission of not less than three members, which will control State highways and have advisory supervision over all others. The endeavor will also be made to work out a uniform plan of highway engineering.

Massachusetts Civic League.—The Executive Committee of the Massachusetts Civic Conference met October 21, and owing to the important vote on play grounds at the next city election under the provisions of Chapter 513 of the Acts of 1908, it was decided to add another session to the conference, and have Mr. Jacob Riis address a mass meeting on the playground question. Prof. Royce, who was to have talked on Provincialism, or local patriotism, on Friday evening, November 12, will give his address on Thursday evening, November 12, in Huntington Hall, and Mr. Riis will speak on playgrounds on Friday evening, the 13th, also in Huntington Hall. The other sessions of the conference, the ones on village improvements, industrial education and the utilization of the gang spirit, will be held, as formerly announced, on the morning of November 13, the afternoon of November 13 and the morning of November 14, respectively.

Wisconsin Association of Police Chiefs.—In answer to letters sent out by Chief of Police Henry C. Baker, of Racine, answers have been received from over thirty, signifying their willingness to organize an Association of Police Chiefs of Wisconsin, and a meeting has been called for that purpose, to be held at the central police station, Milwaukee, November 5. The object of the proposed organization is to bring about closer relations between the heads of departments and thus strengthen the efforts in capturing criminals.

Calendar of Meetings

- November 4.**
American Society of Civil Engineers.—Regular semi-monthly meeting, Society House, 220 West Fifty-seventh street, New York City.—Charles Warren Hunt, Secretary.
- November 17-19.**
Atlantic Deeper Waterways Conference.—Baltimore, Md.—J. Hampton Moore, President, Philadelphia, Pa.
- November 17-20.**
National Municipal League.—Annual meeting, Pittsburg, Pa.—Clinton Rogers Woodruff, Secretary, 705 North American Building, Philadelphia, Pa.
- American Civic Association.**—Annual Meeting, Pittsburg, Pa.—Clinton Rogers Woodruff, Secretary, 705 North American Building, Philadelphia, Pa.
- November.**
League of California Municipalities.—Eleventh Annual Convention, Sacramento.—H. A. Mason, Secretary, Mountain View, Cal.
- November 30-December 1.**
American Society of Refrigerating Engineers.—Annual Meeting, New York City.—W. H. Ross, Secretary, 154 Nassau street, New York City.
- December 1-3.**
Annual Conference of Sanitary Officers.—Albany, N. Y.—Eugene H. Porter, State Commissioner of Health, Albany, N. Y.
- December 1-4.**
American Society of Mechanical Engineers.—Annual Meeting, New York City.—Calvin W. Rice, Secretary, 29 West 39th street, New York City.
- December 9-11.**
National Rivers and Harbors Congress.—Washington, D. C.
- December 15-17.**
American Institute of Architects.—Annual convention, Washington, D. C.—Glenn Brown, Secretary, The Octagon, Washington, D. C.
- January 19-21.**
American Society of Heating and Ventilating Engineers.—Fifteenth annual meeting, Engineering Societies Building, 29 West Thirty-ninth street, New York, N. Y.—W. M. Mackay, Secretary, P. O. Box 1818, New York, N. Y.

PERSONALS

BAUM, WM. B., Mayor of Saginaw, Mich., has been renominated for the eighth successive time.

BOAZ, JOHN, Chief of the Fire Department of Hamilton, O., for twenty-five years, died October 22, at the age of 77.

BRIGGS, WILLIAM, Wilkes-Barre, Pa., formerly Chief of Police, died October 24.

CARRERE, J. M., and **ARNOLD W. BRUNER**, New York City, have been engaged by the Committee on "The Comprehensive City Plan of Grand Rapids," Mich., and will pass on the plans that have already been outlined by Dan'l H. Burnham.

FLETCHER, HENRY, Providence, R. I., has received the Republican nomination for Mayor.

GUTHRIE, OSSIAN, Chicago, Ill., died recently at the age of eighty-two. Mr. Guthrie was known as the father of Chicago's drainage system. He drafted the plan now in use in 1885.

HARRIS, RUFUS W., Johnston, R. I., President of the Town Council, died October 21.

HAYDEN, JOHN C., Rochester, N. Y., has tendered his resignation as Chief of Police, after thirty-seven years of service. Chief Hayden wished to resign a year ago but was persuaded to continue in office. His duties will be divided between the new chief and an inspector.

KENT, JOHN S., Mayor of Brockton, Mass., has announced that he will not be a candidate for re-election again.

MALONE, JAS. H., Mayor of Memphis, Tenn., suggested that the walls of the new Shelby County Court House be decorated with life-sized bust paintings of all former Mayors of Memphis, and the plan will be adopted.

MILLER, GEORGE L., Mayor of Garden City, Kan., died October 22.

ROBINSON, CHARLES MULFORD, Rochester, N. Y., has completed the report on the improvement possibilities of Cedar Rapids, Ia.

ROGERS, EDWIN H., Boston, Mass., has been appointed City Engineer of Newton, Mass., succeeding the late Irving T. Farnham. Mr. Rogers was for fourteen years employed in the engineering and surveying departments of the city of Boston, and during the past six years has been employed as civil engineer for the Boston & Worcester Street Railway.

SACKETT, FRED. S., Norwood, Mass., Chief of Police, has secured a complete vindication at the hands of the Board of Selectmen of the charges preferred against him.

WEBB, ALBERT, Worcester, England, is on his way to Worcester, Mass., as bearer of a gift of two suits of armor worn by soldiers in the battle of Worcester in 1651. A special committee, consisting of Aldermen Brunell, Holmgren and Sullivan and Councilmen Stevens, Larkin, Midgeley and Lucke, have been appointed to arrange for Mr. Webb's reception.

WITTPENN, H. OTTO, Mayor of Jersey City, N. J., was the chief guest at a testimonial banquet given for him by his friends and appointees, October 21. Covers were laid for 300. The occasion was the Mayor's thirty-sixth birthday anniversary. John J. Vorhees, President of the Board of Finance, was the toastmaster. Addresses were delivered by Frank S. Katzenbach, former Mayor of Trenton; Eugene F. Kinkead, President of the Board of Aldermen; Geo. G. Tennant, President of the Board of Education, and Corporation Attorney, Jas. J. Murphy.

WRIGLEY, JOHN, Captain of the Fire Department of Pittsburg, Pa., died October 20, at the age of 79. He is said to have been the oldest fireman in the United States.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage
Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Street Railways—Sanitation,
Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we can not guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREET IMPROVEMENTS				
Missouri.....	Kansas City.....	Nov. 5.....	Asphalt paving, 14 sts.; creos. block, 1; macadam, 2 sts.....	J. L. Darnell, City Engineer.
Iowa.....	Dubuque.....	Nov. 5, 8 p.m.....	Cement sidewalks on 8-in. cinder base, various sts.....	City Recorder.
Ohio.....	Dayton.....	Nov. 5, noon.....	Grading and graveling 350 lin. ft.; com. curb and gutter, 700 ft.	J. C. Ely, Pres. Bd. Pub. Serv.
Indiana.....	Frankfort.....	Nov. 5, 2 p.m.....	Improving gravel roads in several townships.....	Chas. F. Cromwell, County Aud.
Ohio.....	Cincinnati.....	Nov. 6, noon.....	Improving County roads.....	Fred. Dreihls, County Clk.
Indiana.....	Indianapolis.....	Nov. 6, 2 p.m.....	Bldg. gravel roads between Hancock and Marion Counties.....	Albert Sahm, County Auditor.
Indiana.....	La Fayette.....	Nov. 6, 10 a.m.....	Bldg. 3 gravel roads, Wabash and Tippecanoe twps.....	John P. Foresman, County Aud.
Missouri.....	St. Louis.....	Nov. 6, noon.....	Constructing sidewalks in several streets; cost, \$9,750.....	A. J. O'Reilly, Pres. Bd. Pub. Imp.
Pennsylvania.....	Scottsdale.....	Nov. 6, 8 p.m.....	Brick or block stone paving, curb, etc., Arthur Ave.....	Borough Council.
New York.....	Troy.....	Nov. 6.....	Paving and regulating portion of Second St.....	Jas. M. Riley, Sec'y Bd. C. & S.
Oklahoma.....	El Reno.....	Nov. 6.....	Paving 119 blocks or 145,000 sq. yds.; 5-in. concrete base, 1 1/2-in. binder, 1 1/2-in. wearing surface; cost, \$400,000.....	R. N. Whittlesey, City Eng'r.
New Hampshire.....	Salem.....	Nov. 7.....	Macadamizing State road in Salem, to cost \$4,000.....	A. W. Dean, State Eng'r, Concord.
New York.....	New Brighton.....	Nov. 7.....	Furnishing 2,100 tons crushed stone, during year.....	Geo. Cromwell, Boro. Pres.
Kansas.....	Kansas City.....	Nov. 7.....	Constructing one mile of rock road.....	F. M. Holcomb, County Clerk.
Indiana.....	Crawfordsville.....	Nov. 7, 10 a.m.....	Bldg. Elmore gravel road in Ripley twp.; Lydick rd., Brown tp.	Bennett B. Engle, County Aud.
Kansas.....	Kansas City.....	Nov. 9.....	Macadamizing 18th Street.....	County Commissioners.
New York.....	Albany.....	Nov. 9, noon.....	Constructing 63 new State roads, various Counties.....	Fred'k Skene, State Eng'r.
Ohio.....	Ashland.....	Nov. 9, noon.....	Sidewalks, grading, paving, 2 streets.....	E. L. Berry, Village Engineer.
New Jersey.....	Mt. Holly.....	Nov. 9.....	Macadamizing Bridge St., Crosswicks Village.....	Joel Horner, Director.
Pennsylvania.....	Pittsburg.....	Nov. 9.....	Furn. 3,000 tons balast and screenings for road.....	F. P. Booth, County Comptlr.
New York.....	New York.....	Nov. 9, 11 a.m.....	Asphalt paving on concrete, various sts. in Bronx.....	L. F. Haffin, Pres. Boro. Bronx.
New Jersey.....	Crosswicks.....	Nov. 9.....	Macadamizing Bridge St., 700 lin. ft.....	Joel Horner, Dir. Bd. Freeholders.
Kentucky.....	Ashland.....	Nov. 9, 7:30 p.m.....	Vit. brick paving, 44,540 sq. yds.; concrete curb and gutters, 21,000 lin. ft.; concrete headers, 8,500 lin. ft.....	J. Y. Bosley, City Engineer.
Texas.....	Texas City.....	Nov. 9.....	Regrading and ditching 8,000 ft. of roads.....	J. M. Murch, Co. Aud., Galveston.
North Dakota.....	Washburn.....	Nov. 10, 2 p.m.....	Grading, etc., in McLean County.....	O. B. Wing, County Auditor.
Indiana.....	South Bend.....	Nov. 10, 10 a.m.....	Brick paving, 2 alleys; grading, 2 avenues.....	W. A. McNery, Chm. Bd. Pub. Wks.
New York.....	New Brighton, S. I.....	Nov. 10.....	Wood block, brick, etc., paving, on concrete.....	Geo. Cromwell, Boro. Pres.
New York.....	Albany.....	Nov. 11, noon.....	Improving 3 roads, Albany Co., 3.88, 2.24 and 4.12 miles long.....	Fred'k Skene, State Engineer.
New York.....	Brooklyn.....	Nov. 11.....	Reg. and repaving sheet asphalt, 9 sts., 14,850 sq. yds.; granite, 2 sts., 13,830 sq. yds.; cement walks, 22,940 sq. ft., 4 sts.....	Bird S. Coler, Boro. Pres.
Missouri.....	St. Louis.....	Nov. 13, noon.....	Brick block paving alleys; cost, \$72,000.....	A. J. O'Reilly, Pres. Bd. Pub. Imp.
New York.....	Albany.....	Nov. 13, noon.....	Constructing large number of State roads.....	Fred'k Skene, State Engineer.
Indiana.....	Valparaiso.....	Nov. 13, 8 p.m.....	Improving various streets.....	Chas. D. Jones, City Clerk.
Indiana.....	Covington.....	Nov. 14.....	Bldg. gravel roads Nos. 1 and 2, separate, Van Buren twp.....	Wm. B. Gray, County Aud.
Indiana.....	Bloomfield.....	Nov. 14.....	Constructing gravel road in Richland township.....	Peter Cook, County Aud.
Ohio.....	Cleveland.....	Nov. 14, 11 a.m.....	Improving Mayfield road, Euclid township.....	W. F. Black, County Clerk.
New York.....	Ithaca.....	Nov. 15.....	Laying 5,800 ft. 4 and 5-ft. cement walks; 4,720 ft. curb and gut.	Newman & Stagg, Savings Bank Bld.
Louisiana.....	Opelousas.....	Nov. 18, 4 p.m.....	Constructing 34,870 sq. ft. cement sidewalks.....	M. Halphen, Mayor.
Indiana.....	Indianapolis.....	Nov. 20.....	Asphalt, brick and bitulithic paving, etc., several streets.....	Blaine Miller, City Engr.
Indiana.....	Wabash.....	Nov. 20, 10 a.m.....	Constructing gravel road.....	J. P. Nofztger, County Aud.
Ohio.....	Bowling Green.....	Nov. 20.....	Improving Lehman Ave. from Main St. to railroad.....	Alex. Williamson, City Clerk.
Ohio.....	Cincinnati.....	Nov. 20.....	Bldg. embankments, New Rich. pike, 4,588 mile creeks.....	Fred. Dreihls, County Clerk.
Ecuador.....	Guayaquil.....	Dec. 1.....	Paving and sewer work.....	Sewerage and Water Board.
WATER SUPPLY				
Ohio.....	Shawnee.....	Nov. 5.....	Furn. mat. and laying 9,433 ft. 4, 6, 8-in. c. i. pipe, etc.....	Bradbury & Shute, Engrs., Col'bus.
Illinois.....	Stockton.....	Nov. 6.....	Drilling a well to depth of 1,500 ft.....	Freeman Lawler, Vil. Pres.
New York.....	Ft. Slocum.....	Nov. 7, 11 a.m.....	Extending water main, inc. 600 ft. 4-in. c. i. pipe, etc.....	Capt. Peter Murray, Q. M.
Missouri.....	Kansas City.....	Nov. 9, 2 p.m.....	Bldg. 45 to 50 mill. gal. settling basin at Quindaro; 2 types of construction; plans, Bd. Fire and Water Com'rs.....	J. L. Darnell, City Engineer.
Colorado.....	Las Animas.....	Nov. 9, 2 p.m.....	Labor and material for water works, inc. new pumping plant, complete; steel tank or stand pipe; 23,000 lin. ft. c. i. extensions to present mains.....	W. R. Murphy, Town Eng'r.
Michigan.....	Detroit.....	Nov. 10, noon.....	Furnishing 3,650 tons 6 to 24-in. c. i. water pipe; 793 4 to 48-in. gate valves; 300 6 to 12-in. testing boxes.....	Benj. F. Gurnsey, Sec'y Water Com.
Mississippi.....	Clarksdale.....	Nov. 10, 8 p.m.....	Bldg. 3-4 mile 6-in. water main, etc., reservoir, 80 x 55 x 9 ft., with metal shingle roof; also 1 3/4 miles 8-in. sewer.....	W. G. Kirkpatrick, Jackson, Eng.
Kansas.....	St. Marys.....	Nov. 10.....	Constructing \$47,000 water works and \$15,000 light plant.....	Henry B. Mees, City Clerk.
Illinois.....	Chicago.....	Nov. 11, noon.....	Bldg. rein. concrete dam, etc., for Sanitary Dist.....	R. R. McCormick, Pres. Sanitary Dist.
California.....	San Diego.....	Nov. 12, 10 a.m.....	Constructing reservoir; estimated cost, \$121,000.....	F. H. Dixon, Clk. Bd. Pub. Wks.
Alabama.....	Gadsden.....	Nov. 12, noon.....	Water works, extensions and improvements for city.....	Hazlehurst and Anderson, Eng'rs.
Ohio.....	Toledo.....	Nov. 12, noon.....	Cont. 11; bldg. pumping station, coal storage and pump well; labor and material bids separate.....	Reynold Voit, Sec'y Bd. Pub. Serv.
Iowa.....	Fort Dodge.....	Nov. 12, 2 p.m.....	Constructing 2,500-gal. steel tank on 75-ft. tower.....	Oakland Cemetery Asso.
New York.....	New York.....	Nov. 17, 11 a.m.....	Making borings along one or more lines south of Hill View reservoir in Bronx, Manhattan, and Brooklyn.....	J. Waldo Smith, Ch. Eng'r Bd. W. S.
California.....	San Francisco.....	Nov. 18.....	Pumping stations, pumps, turbines, etc., for salt water pumping stations; cost, \$257,000.....	Board of Public Works.
Texas.....	Ft. McIntosh.....	Nov. 20, 10 a.m.....	Furn. and install. new boiler, purif. apparatus, etc.....	Col. John L. Clem, U. S. A., San Ant.
Florida.....	Pensacola.....	Nov. 21, 11 a.m.....	Installing water mains, pump, mach., etc., at navy yard.....	Commandant, Navy Yard.
Delaware.....	Wilmington.....	Nov. 23, 10:30 a.m.....	Constructing covered slow sand filtration plant, with filter, water reservoir, sand washing apparatus, etc.....	John A. Kienle, Ch. Eng. Water Bd.
Mississippi.....	Meridian.....	Nov. 24.....	Furn. and erect. 5,000,000-gal. hori. cross compound and fly-wheel pump engine; also bldg. rein. concrete and reservoir.....	C. C. Dunn, Pres. W. W. Com.
Washington.....	Wenatchee.....	Nov. 24, noon.....	Bldg. pumping station and pipe tunnel; furn. pump, motor and starting panel; reservoir complete, etc.....	Roy Zahren, City Engineer.
Brazil.....	Parahyba.....	Nov. 24.....	Bldg. water supply system, etc., for city.....	Govt. State of Parahyba.
California.....	Los Angeles.....	Nov. 30, 11 a.m.....	Constructing 11 miles open and lined ditch work of Antelope Sec. Los Angeles aqueduct, inc. 58,625 ft. canal lining, with cover and back fill; 283,140 cu. yds. excavating; 446 cu. yds. plain concrete in culverts; 100 cu. yds. rubble concrete; lining 280 lin. ft. of tunnel, now excavated.....	Board of Public Works.
Florida.....	Daytona.....	Jan. 1.....	Constructing water works for city.....	D. D. & C. M. Rogers, Engineers.

SEWERAGE

Minnesota.....	St. Paul.....	Nov. 5.....	Constructing sewer in portions several streets.....	R. L. Gorman, Clk. Bd. Pub. Wks.
Ohio.....	Springfield.....	Nov. 5, noon.....	Constructing sewers in 3 aves. and 4 sts., inc.: 580 ft. 42-in.; 910 ft. 30-in.; 1,110 ft. 18-in.; 1,150 ft. 15-in.; 900 ft. 12-in.; 1,840 ft. 10-in.; 4,662 ft. 8-in.; 9,384 ft., 6-in.; 4 contracts, surety, \$1,650.....	Wm. H. Mahoney, Clk. Bd. Pub. Serv.
Pennsylvania.....	Harrisburg.....	Nov. 6, noon.....	Laying 15-in. t.c. pipe sewer in 15th St.....	W. W. Caldwell, Hwy. Com'r.
Utah.....	Salt Lake City.....	Nov. 6, 8 p.m.....	Constructing sewer extension No. 211.....	L. C. Kelsey, City Engineer.
Indiana.....	Indianapolis.....	Nov. 6, 10 a.m.....	Bldg. sewer beneath Market House and in Wabash St., 1,675 ft.....	Blaine Miller, City Engineer.
Iowa.....	Spencer.....	Nov. 6, 8 p.m.....	Constructing vit. pipe sewer in Main St.....	R. L. Taylor, City Clerk.
California.....	San Diego.....	Nov. 7.....	Constructing University Heights sewer; cost, \$120,000.....	Board of Public Works.
Ohio.....	College Hill.....	Nov. 7.....	Constructing Sewers in Woodward Ave.....	F. R. Strong, Vil. Clerk.
Ohio.....	Lockland.....	Nov. 9.....	Furn., etc., 750 ft. 15-in. sanitary sewer.....	Clifford Troy, Village Clerk.
Ohio.....	Zanesville.....	Nov. 9.....	Constructing storm and sanitary sewer, 2 streets.....	J. T. Hahn, Clk. Bd. Pub. Serv.
New York.....	New York.....	Nov. 9, 11 a.m.....	Constructing sewers, etc., in various streets in Bronx.....	L. F. Haffen, Boro. Pres.
Indiana.....	South Bend.....	Nov. 10.....	Constructing Jefferson, Hine St. and Haney Ave. sewers.....	Board of Public Works.
Mississippi.....	Clarksdale.....	Nov. 10, 8 p.m.....	Constructing 1 3-4 miles 8-in. house sewers, 6-in. water main, etc.....	M. W. Purnell, City Clerk.
New York.....	New Brighton, S.I.....	Nov. 10.....	Bldg. separate storm water outfall sewer, inc. 617 ft. rein. concrete, flat-roof twin section and 3-ft. circular sewer; 50 ft. 15-in. vit. pipe; 400 ft., 8 in.; 9,300 ft. piles, etc.....	Geo. Cromwell, Boro. Pres.
Iowa.....	Clinton.....	Nov. 10.....	Constructing pipe sewers to cost \$3,000.....	Wm. E. Hayes, City Clerk.
Illinois.....	Marshall.....	Nov. 12.....	Laying 2 miles rein. concrete and vit. pipe sewers.....	Paige & Stock, Eng'rs, Terre Haute.
Texas.....	Barstow.....	Nov. 14.....	Constructing drainage system.....	J. J. Walker, Secretary.
New York.....	Ithaca.....	Nov. 15.....	Constructing 3,000 ft. 6-in. sewer for Bryant Park Co.....	Newman & Stagg, Sav. Bank Bldg.
Ohio.....	Hartwell.....	Nov. 16, noon.....	Labor and material, for building sewers and disposal plant.....	Riggs & Sherman Co., Eng'rs, Toledo.
Dist. of Col'bia.....	Washington.....	Nov. 16, noon.....	Bldg. Sec. D east side intercept sewer, Brkld to bound, also service sewers in Conduit road.....	Jay J. Morrow, Eng'r Com.
Iowa.....	Port Dodge.....	Nov. 16, 5 p.m.....	Bldg. 8-in. sanitary sewers, 4 sts.; 10-in. vit. storm, 1st.....	King E. Beal, City Clerk.
Brazil.....	Parahyba.....	Nov. 24.....	Bldg. drainage system, etc., for city.....	Govt. State of Parahyba.
Ecuador.....	Guayaquil.....	Dec. 1.....	Constructing sewerage system.....	Int. Bur. of Am. Rep., Wash'n, D. C.

BRIDGES

South Carolina.....	Lexington.....	Nov. 5.....	Bldg. steel bridge over Salunda River.....	G. H. Koon, County Superv.
Texas.....	Austin.....	Nov. 5, 11:30 a.m.....	Bldg. rein. concrete arch bridge 110 ft. long, 38 ft. rdwy., two 5-ft. walks over Col. Riv. at Congress St.; also removing steel bridge now there; Waddell & Harrington, K. C., Mo., Engrs.....	John W. Hornsby, County Judge.
South Carolina.....	Lexington.....	Nov. 5.....	Bldg. steel bridge over Salunda River.....	Geo. H. Koon, Co. Superv.
Indiana.....	Tipton.....	Nov. 6, 2 p.m.....	Constructing joint County bridge.....	J. F. Barlow, County Auditor.
Indiana.....	Frankfort.....	Nov. 7.....	Furn. material and bldg. 4 bridges for County.....	C. F. Cromwell, County Auditor.
Iowa.....	Grundy Center.....	Nov. 9, noon.....	Furnishing County with bridge lumber for 1909.....	E. G. Ensoninger, County Auditor.
California.....	Los Angeles.....	Nov. 9, 2 p.m.....	Bldg. pile trestle bridge, also rein. concrete culvert.....	C. G. Keyes, County Clerk.
Nebraska.....	Freemont.....	Nov. 10, noon.....	Furn. mat. and bldg. sev. sub. superstructures and approaches.....	County Commissioners.
Ohio.....	Cleveland.....	Nov. 11, 11 a.m.....	Bldg. concrete bridge and retaining wall, Strongsville twp.....	A. B. Lea, County Surveyor.
Ohio.....	Toledo.....	Nov. 11, 10 a.m.....	Sub and superstructure, bridge, Swan Creek, Adams twp.....	L. B. Bailey, County Com'r.
Illinois.....	Chicago.....	Nov. 11, noon.....	Bridge work, etc., for Sanitary District.....	R. R. McCormick, Pres. San. Dist.
Maryland.....	Takoma Park.....	Nov. 11.....	Bldg. bridge over Sligo stream; new bids.....	Benj. G. Davis, Town Clerk.
Iowa.....	Charles City.....	Nov. 12, 10 a.m.....	Plans and bldg. steel concrete bridge, 262 x 73 ft.....	J. G. Cutler, Chm. Co. Com'rs.
Ohio.....	Madisonville.....	Nov. 13.....	Constructing concrete bridge on Main St.....	Fred. Dreihls, Co. Clk., Cincinnati.
Ohio.....	Toledo.....	Nov. 14, 10 a.m.....	Bldg. bridge and abut. over Swan Creek; also sub. of bridge.....	L. B. Bailey, Chm. Co. Com'rs.
Michigan.....	Whitefish Point.....	Nov. 15.....	Bldg. bridge over Tahquamenon River.....	Frank House, Highway Com'r.
Indiana.....	Elkhart.....	Nov. 16, 9:30 a.m.....	Repairs to Co. line bridge No. 39, inc. piers and abut.....	D. O. Batchelor, County Aud.
Arkansas.....	Marianna.....	Nov. 18, 2 p.m.....	Bldg. steel hwy. bridge, 450 ft. long, over L'Anguille River.....	County Court Clerk.
North Carolina.....	Beaufort.....	Nov. 20.....	Bldg. steel draw-span bridge, pile and concrete foundation.....	Capt. E. I. Brown, Eng. Corps, U.S.A.
Florida.....	Pensacola.....	Nov. 21, noon.....	Bldg. wooden bridge over Little Bayou.....	A. M. McMillan, Clk. Co. Com'rs.
Florida.....	Pensacola.....	Nov. 24.....	Bldg. Bayou Chico bridge for County.....	County Commissioners.
Virginia.....	Hanover.....	Nov. 25.....	Bldg. steel and rein. concrete bridge over Chicka River.....	Thos. R. Puller, Chm. Joint. Com.
Mississippi.....	Grenada.....	Dec. 7.....	Bldg. iron bridge over Bogue Creek at Tie Plant.....	County Commissioners.
Indiana.....	Rensselaer.....	Jan. 12.....	Constructing bridge over Kanku River.....	J. H. Leatherman, County Aud.

LIGHTING AND ELECTRICITY

Kansas.....	St. Marys.....	Nov. 10, 3 p.m.....	Bldg. \$15,000 electric light plant and \$47,000 water works.....	Dr. N. S. Clothier, Mayor.
Wisconsin.....	Madison.....	Nov. 10.....	Electric wiring east wing of new Capitol bldg.....	Geo. B. Post, Arch., New York City
New York.....	Plattsburg.....	Nov. 18.....	Bldg. transformer station and install. elec. light system; also furn. elec. energy for operation.....	Constr. Q. M., Barracks.
Ohio.....	Springfield.....	Nov. 21.....	Bldg. new power plant at hospital.....	F. C. Boggs, Gen. Pur. Agt., Isth.C.C.
Dist. of Col'bia.....	Washington.....	Nov. 23, 10:30 a.m.....	Electrical supplies, etc.; for Isthmian Canal Com'n.....	Govt. State of Parahyba.
Brazil.....	Parahyba.....	Nov. 24.....	Bldg. lighting system, etc., for city.....	Jas. P. Berry, Sec'y Bd. C. & S.
Connecticut.....	Hartford.....	Jan. 4.....	Lighting sts. for 1 or 5 years from June 1, 1909.....	

MISCELLANEOUS

California.....	Sacramento.....	Nov. 5, 2 p.m.....	Erecting jail building; R. A. Herold, Bryte bldg., Arch.....	Wm. B. Hamilton, Clk. Co. Superv.
New York.....	Troy.....	Nov. 6.....	Bldg. docks and wing docks, etc., Rensselaer St.....	Jas. M. Riley, Sec'y Bd. C. & S.
Ohio.....	Columbus.....	Nov. 9.....	Mach. and equipment, garbage disp. plant; \$125,000 to handle 80 tons day; also \$25,000 building.....	E. W. Hirsch, Sec'y Bd. Pub. Serv.
England.....	London, E. C.....	Nov. 10.....	Supply and erection, 60-ton refuse incinerator for Adelaide.....	Agt. Gen. for So. Austr., 1 Crosby Sq.
Illinois.....	Chicago.....	Nov. 11, noon.....	Excavating channel, Sec. 12, No. Shore Channel, etc.....	I. J. Bryan, Clk. Sanitary Dist.
New York.....	Syracuse.....	Nov. 16, 1:30 p.m.....	Furnishing 2,500 ft. of fire hose.....	F. T. Pierson, Sec'y Bd. C. & S.
Ohio.....	Columbus.....	Nov. 16, noon.....	Reduction machinery for disp. of garbage, etc., Cont. 3.....	I. S. Osborn, Eng. Reduction Plant.
Arkansas.....	Paragould.....	Nov. 17, 11 a.m.....	Constructing ditch to straighten Creek, 9 miles.....	Lund & Hill, Little Rock, Eng'rs.
New York.....	Albany.....	Nov. 17.....	Additional barge canal work; estimate, \$6,877,337.....	F. C. Stevens, State Supt. Pub. Wks.

STREET IMPROVEMENTS

Huntsville, Ala.—Council has ordered sidewalks laid on Franklin, Gates and Green streets.—D. B. Lillard, City Clerk.

Tuscaloosa, Ala.—The Mayor and Aldermen have passed ordinances for the construction of two and a half miles of cement sidewalks.

San Bernardino, Cal.—City has sold \$110,000 street bonds to the San Bernardino National Bank.

San Francisco, Cal.—The paving of portions of Minna and Folsom streets is contemplated at a cost of \$13,600.

Woodland, Cal.—South First street is to be macadamized from Main street to the southern limit of the city under the direction of the city Trustees.

Hartford, Conn.—All bids for State road work in the town of Sharon have been rejected; the work will be readvertised.—Address State Highway Commissioner.

New Britain, Conn.—The Board of Public Works has received petitions for the grading and establishing of ten streets.

Elkton, Del.—Cecil County Commissioners have awarded to Hambleton & Co., of Baltimore, \$25,000 road bonds.

Washington, D. C.—The Commissioners have included a special item in the estimates to be submitted to Congress for the replacement of the granite paving in Nine-

teenth street northwest, from L to N streets.

Washington, D. C.—The Commissioners have decided to resurface with sheet asphalt portions of New Jersey avenue; estimated cost, \$27,000; also repairing Fiftieth and Seaton streets.

Decatur, Ga.—The city has voted \$30,000 bonds for street improvements.

Macon, Ga.—Mayor Miller has appointed a special committee to look into the matter of a municipal plant for the manufacture of bricks for paving the streets and alleys of the city.

Bloomington, Ill.—The City Clerk has been instructed to advertise for bids for paving Katherine street, from Chestnut to Kelsey street; plans, etc., at office of C. F. Fauntz, City Engineer.

Lincoln, Ill.—Council has received ordinance for paving Third street from Maple to State streets.

Quincy, Ill.—Council has directed estimates to be prepared for paving South Quincy street; the Board of Aldermen has passed an ordinance for paving Kentucky street with vitrified block; also received three ordinances for improving streets.

Crawfordsville, Ind.—Bids will be received by B. B. Engle, County Auditor, until November 7, 10 a. m., for improvement of a highway.

Elkhart, Ind.—Bids will shortly be received for paving with asphalt on S. Main street.

Ft. Wayne, Ind.—Plans are being prepared, it is stated, for grading and paving W. Berry and Spring streets.

Indianapolis, Ind.—Council has passed resolutions for the laying of sidewalks on five streets.

South Bend, Ind.—Council has ordered the Street Commissioners to grade Menges avenue.

Vincennes, Ind.—The Board of Works has received a resolution calling for the opening up of an alley from Ninth to Tenth street, between Prairie and Willow, and November 20 was fixed as the time for hearing remonstrances on the same; also a petition for permission to put down concrete walk and stone curbing in front of lot on First street between Scott and Harrison.

Burlington, Ia.—Bids will shortly be received for brick paving on Fourth street from Division to Maple street, on Elm street from Third to Fifth street, and in alley No. 5 from Jefferson to Valley street.—F. L. Unterkircher, Mayor.

Davenport, Ia.—Council has ordered the grading of eight streets.—Hugh Moeller, City Clerk.

Dubuque, Ia.—Bids will be received November 5 for constructing cement sidewalks, concrete foundation, on certain streets.—Ed. A. Lineman, City Recorder.

Waterloo, Ia.—Bids for constructing sidewalks have been rejected; new bids will be asked at once.

Leavenworth, Kan.—Council has passed an ordinance for the paving of Seventh street from Olive to Short street.

Columbus, Kan.—Estimates are being prepared for sewers.

Lawrence, Kan.—The Committee on Streets has granted petitions for the widening of Billerica street from Lawrence street to Denton street, in Wigginsville.

Lawrence, Kan.—The Committee on Streets has received petition for a sidewalk of edgestones and cinders in White street, from Moody street to Bodwell avenue, and for crossing at intersection of Moody and White streets, and at Dracut street; also in West Sixth street abutting St. Louis' church rectory, northerly to Ennell street; on the northerly side of Sheldon street from Bellevue street to the end of the present edgestones, and in Main street.

Pittsburg, Kan.—Council has been petitioned for paving several streets.—Address Mayor Fisher.

Lexington, Ky.—Mayor John Skain has been authorized by the joint Improvement Committee to obtain expert advice as to the advisability of surfacing worn-out brick pavements with asphalt.

New Orleans, La.—City is considering paving of Main and North Boulevard; cost, between \$20,000 and \$25,000.

Baltimore, Md.—The Board of Public Improvements has approved the improving of seven streets and has appropriated \$83,200; also approved ordinances for paving Dover street and for an improved pavement in the bed of Eastern avenue.

Baltimore, Md.—Chief Engineer B. T. Fendall has asked the Board of Estimate for \$433,838.34; of this amount \$74,356 will be used for paving North avenue; \$15,000 for paving Light street, and regular expense, \$405,600.

Boston, Mass.—The Street Commissioners have taken under advisement the laying out and construction of Upham avenue, Carmen street, Mountain avenue; also for extension of Belfort street.

Dalton, Mass.—The matter of widening the driveway under the Boston and Albany railroad at a section of the road in Dalton called the Red House crossing may be decided soon; the situation has been thoroughly examined by the Dalton Selectmen, the County Commissioners and representatives of the railroad corporation, and the plans call for a 30-foot driveway with 14 feet head room; the work will cost nearly \$13,000.—Address Berkshire County Auditor, Pittsfield.

Haverhill, Mass.—The Street Committee has urged Superintendent of Streets Westcott to use the \$30,000 remaining in street fund for repairing streets.

Lawrence, Mass.—Engineers are estimating the cost of rebuilding the proposed boulevard between Lawrence, Methuen and Lowell.—County Commissioner Jas. C. Poor.

Lowell, Mass.—Council has received petitions for the grading of Apple and Billerica streets, and that a sidewalk of edgestones and cinders be laid on West Sixth and White streets.

Wareham, Mass.—The town will vote on providing more sidewalks, and that from Onset Bay to Buzzard's Bay or the Bourne town line, near the latter village; distance, 2½ miles.

Battle Creek, Mich.—Council has been petitioned for change of grade on Rittenhouse avenue; cement sidewalk on Bluff street and the opening of a street between the Grand Trunk shops and bridge at foot of Wren street.

Battle Creek, Mich.—Council has ordered cement sidewalks placed on Liberty, Nelson and Mott streets and Kingman avenue; also public improvements on Main street and Washington avenue.

Detroit, Mich.—Council has directed the Department of Public Works to advertise for proposals for paving two alleys, 20 feet wide, with vitrified brick on concrete foundation.—J. J. Haarer, Commissioner.

Detroit (Ford), Mich.—A special election will be held to decide the question of issuing \$80,000 bonds for paving purposes.

Manistee, Mich.—Cement sidewalks will be constructed on Washington street and in Alderman Hoffman's District.

Marquette, Mich.—No contract was let for clearing, grubbing and grading portion of road between Humboldt and Republic, and work will be done by the road commission of Marquette County.—W. H. Johnston, Chairman.

Kansas City, Mo.—The Board of Public Works recommends the use of stone blocks for paving.

Nevada, Mo.—The County Court has agreed to pave the remaining 30 feet around the square with brick.

Greenwood, Miss.—The Board of Supervisors of LeFlore County has authorized the issuance of \$100,000 of bonds for road construction.

Gulfport, Miss.—Harrison County has voted \$50,000 bonds for improvement of roads and bridges.

Gulfport, Miss.—Taxpayers have voted \$50,000 in bonds for improving public highways.

Great Falls, Mont.—Council has passed a resolution for the grading and boulevarding of Sixth avenue South, from Third to Ninth street; Third avenue South, from Seventh to Twelfth street; Seventh street North, from Third avenue North to Ninth avenue South, and Fourth avenue South from Third to Sixth street, in all about twenty-six blocks.—C. W. Swearingen, City Engineer.

South Omaha, Neb.—John J. Gillen, City Clerk, will shortly take figures on twelve blocks of brick block paving on L street and four blocks on E street.

Graham, N. C.—Bids will be received by the Highway Commission of Alamance County December 7, noon, for \$200,000 5 per cent. macadam bonds.—D. A. White, Secretary.

Geneva, N. Y.—The Board of Public Works has ordered a sidewalk on Avenue A, near Genesee street; also a new grade line on Hamilton street.

Akron, O.—Council has passed an ordinance for the changing of grade on Holloway street.—Dow W. Harter, Clerk.

Ashland, O.—A. P. Black, Village Clerk, will receive bids until November 9, for the grading, paving and curbing of Church street, from the north line of Second to Pleasant street.—E. L. Berry, Village Engineer.

Ashland, O.—A petition has been presented to Council by the property and lot owners of Bank street asking for the grading, curbing and paving of that street to the width of 40 feet.

Cincinnati, O.—City Engineer Sundmaker recommends to the Board of Public Service that the material to be used in paving the embankment on Beechmont avenue be changed from limestone to reinforced concrete.

Columbus, O.—The City Engineer has presented plans to the Board of Public Service for broadening High street north of the Union Depot; the proposed widening extends north as far as Spruce street for 340 feet; the plans will be presented to Council.

Dayton, O.—City Engineer Cellarius has estimated the cost of paving Morton avenue at \$9,335.

Dayton, O.—The estimate for paving Newton avenue is \$9,335; Dayton Street Railway will pay \$3,636.80 and the city \$1,093.20; the property holders will pay the rest.

Dayton, O.—No bids were received for making sidewalks on various portions of the Great Miami Boulevard.

Hamilton, O.—Council has ordered cement walks placed at corner of Fifth and Ludlow and on Second street; also the improvement of four streets; estimated cost, \$19,965.

Ironton, O.—The proposed concrete storm water sewers will cost about \$45,000. Nothing will be done in the way of construction for some time, as the matter of location is now in the courts.—J. R. C. Brown, Chief Engineer Board Public Service.

Springfield, O.—A petition is being circulated by the property owners on East High street, asking that that street be repaved with asphalt in the spring.

Youngstown, O.—Council has decided that it is necessary to grade, drain and improve Bellview avenue between Williamson and Pyatt streets.

Youngstown, O.—Council has passed resolution to issue \$2,000 bonds for improving Andrews avenue.

Youngstown, O.—Bids will be received November 9 for purchase of about \$10,000 5 per cent. street improvement bonds.—Wm. I. Davies, City Auditor.

Youngstown, O.—Council has passed ordinances for the improvement of Wellendorf and Bissell avenues and Canton street.—M. F. Hyland, City Clerk.

El Reno, Okla.—Property owners have issued a ukase to the City Council demanding that the business and residence portions of the city be paved at once; proposals for bids to pave one hundred and fifty blocks, with either brick or asphalt, will be advertised for this week.

Oklahoma City, Okla.—Council has adopted plans for about seventeen miles of paving to be done immediately.

Oklahoma City, Okla.—Council has decided that it is necessary to grade Ames avenue from the south line of College addition to Sixteenth street.—Geo. Hess, City Clerk.

Supulpa, Okla.—City contemplates street improvements.—Address the Mayor.

Portland, Ore.—At a recent letting all local contractors refused to bid on the improvement of ten streets.

Harrisburg, Pa.—Council has passed first reading ordinances providing for change on curb lines and paving of Reese and Nectane streets; also received ordinances for opening and grading Thirteenth street; paving of Mary street and Shanklin alley. Council has received a petition for the

paving at once of Front street from Reilly to McClay.

New Castle, Pa.—Councilman A. D. Newell and the Clerk will advertise for bids for paving of Scanlon alley just as soon as the Mayor signs the ordinance; also for Diamond and Market streets.

Pittsburg, Pa.—The special committee appointed by Councils several months ago has not yet decided on the advisability of locating a municipal asphalt plant on one of the 20 or more sites which have been offered for sale to the city at prices ranging from \$10,000 to \$150,000.

Williamsport, Pa.—Council has authorized the paving of the east half of Market street.—J. J. Galbraith, City Clerk.

McKeesport, Pa.—The Street Committee of Councils has recommended a resolution providing for use of brick in repaving Shaw avenue, between street car tracks as well as on the sides, between Huey street and Coursin street.

East Greenwich, R. I.—Taxpayers have voted \$3,300 to be used in rebuilding macadam on Main street and \$1,500 for macadamizing the Post road.

Providence, R. I.—Council has ordered fifteen sidewalks repaired and improved.—W. F. Slade, Commissioner of Public Works.

Chattanooga, Tenn.—The Board of Aldermen has been asked to order the Alabama Great Southern Railway Company to put in a subway instead of the proposed grade on the South Side.

Chattanooga, Tenn.—Mayor Crabtree and Auditor Payne have signed bonds for \$1,000 for paving districts No. 24 and No. 27.

Knoxville, Tenn.—Board of Public Works has instructed Chairman John W. Flenniken to advertise for bids to lay sidewalks in front of the property of W. S. Roberts on Lane street, and Robert Cawood on Fifth avenue.

Brownwood, Tex.—The Attorney General's office has decided that the recent bond election was illegal; the bond issue was for both street improvement and additional school buildings and was not voted on separately; Council will at once order another election to be held and have the two voted on separately.

Dallas, Tex.—Estimates are being prepared for improving State street by paving.—S. J. Hay, Mayor.

Houston, Tex.—City Engineer Tarver is preparing plans for the paving with shell of six streets in the Fifth Ward.

Salt Lake City, Utah.—The Engineering Committee of the City Council has decided to recommend the paving with asphalt and the central parking of Seventh East and Fourth East streets after the manner of Sixth East street; the improvement will be between Brigham and Third South streets; there will be a park in the center 24 feet wide, and on either side there will be a paved roadway 24 feet wide also; cost, \$29,502.

Salt Lake City, Utah.—The Engineering Committee of City Council has recommended the laying of a cement sidewalk on Lair avenue between Ninth and Tenth East streets.

Norfolk, Va.—The authorities of St. Vincent's hospital have asked the Board of Control to pave Church street with asphalt. Henry street is to be paved at a cost of \$8,270.

Norfolk, Va.—The Street Committee has recommended the paving of Nudde, Lincoln and North streets with brick material.

Petersburg, Va.—The Board of Supervisors of Prince George County have ordered built the short cut public road between Disputanta and Newville, which saves one-half of the distance practically, by connecting at Lebanon Church with the present Hines road. John S. Webb has located said line and established grade heights for the four bridges and approaches connecting Black Water.

Richmond, Va.—An election will be held in January to decide question of issuing \$300,000 county road and bridge bonds.—County Auditor E. J. Warren.

Aberdeen, Wash.—Bids will soon be asked for paving Wishkah street with asphalt, brick or treated block; probable cost, \$53,000.—Chas. W. Ewart, City Engineer; P. L. Clark, City Clerk.

Seattle, Wash.—R. H. Thomson, City Engineer, has estimated the cost of paving Taylor avenue at \$127,500; grading and regrading Western avenue and Mercer street, \$66,800; planking Norman street, \$41,000; paving James street, \$5,400, and concrete walks on Lakeside avenue, \$13,300, and in Highland place, \$6,810.

Seattle, Wash.—The Engineering Department estimates the cost of paving Fourth avenue at \$89,000; estimates paving on Third avenue, \$33,000; concrete walks on North and West Seventieth streets, \$4,605; concrete walks on North Eighty-third street, \$4,575; concrete walks on West Seventy-third street, \$6,694; concrete walks on East Jefferson street, \$2,000.

Seattle, Wash.—Council is contemplating the widening of Dexter avenue and opening

of it from Benny Way to Third avenue and Laura street.

Tacoma, Wash.—Commissioner of Public Works H. J. McGregor will gravel all graded streets.

Tacoma, Wash.—Council has ordered about four miles of new pavement, of which about 1½ miles will be of brick or treated wood, one mile of macadam, and the balance of asphalt; also for next year about 50 miles of grading, including concrete sidewalks and storm water drainage, to cost about \$16,000 per mile.—Frank L. Davis, City Engineer.

Colville, Wash.—The only bid received by the State Board of Highway Commissioners for the construction of twelve miles of the proposed state road in Stevens County, that of Rusch & LaPlant, of Colville, at \$611,000, has been rejected as in excess of the available fund.

Tacoma, Wash.—Commissioner of Public Works McGregor has received the plans and advertised for bids for constructing proposed paved roadway through the North end, distance three miles, and estimated cost, \$114,150.

Charleston, W. Va.—Contract has not been let for grading, curbing and paving certain portions of the streets and alleys.—W. A. Hogue, City Engineer.

Beloit, Wis.—The Board of Public Works has received resolution for regrading and building new sidewalks on the south side of Rockwell's addition.

Racine, Wis.—Council has ordered the improving of Main street and Freeman court.—Wm. H. Armstrong, City Clerk.

Racine, Wis.—The Firemen's pension fund committee has purchased \$2,200 Racine street improvement bonds.

SEWERAGE

Bessemer, Ala.—All bids for the construction of Third avenue sewer have been rejected and new bids will be asked.

Eldorado, Ark.—The Metropolitan Investment Company, Little Rock, is considering construction of sewerage system and water works at Eldorado.

Monticello, Ark.—Walter G. Kirkpatrick, Jackson, Miss., will prepare plans for a system of house sewers for Monticello.—Patrick Henry, Mayor.

Mayfield, Cal.—Bids will probably be called for early in 1909 for the construction of a sewerage system to cost about \$45,000.—W. H. Myrick, Town Clerk.

Monterey, Cal.—City has ordered sewer on Cass and Webster streets.

San Jose, Cal.—A petition was received by the Mayor and Common Council from George Edmans, J. R. Henwood, Ed P. Bonar and C. C. Payne, the Trustees of Gardner Sanitary District, asking for authority to connect the contemplated Gardner District main sewer with the sewer of the city of San Jose at Vine street.

Pasadena, Cal.—Council has recommended that a 10-inch sewer be constructed on Colorado street; 8-inch sewers in twelve avenues; City Engineer Van Arnum has recommended the construction of sewers in seven avenues and six streets.

Roseville, Cal.—It is proposed to organize a sanitary district to construct a sewerage system, to cost about \$35,000; engineer not yet selected; a vote for a Sanitary Board to have charge of the work will be taken about December 1.—F. C. Hill, Secretary Chamber of Commerce.

Willows, Cal.—Citizens will vote on issuing \$30,000 bonds for installation of sewer system.

New Britain, Conn.—The Board of Public Works has asked Board of Sewer Commissioners to estimate the cost of 500 feet of sewer in West street; also ordered the construction of seventeen catch basins in various streets.

Brunswick, Ga.—Bids will be received by R. R. Hopkins, Mayor, December 1, noon, for the sale of \$64,000 5 per cent. sewerage and drainage bonds.

Bloomington, Ill.—The City Clerk has been instructed to advertise for bids for construction of sewer on Clay street and Hinshaw avenue; also on Clay from Denver to State street, and on Clay from Indianapolis to Robinson street.—C. F. Fauntz, City Engineer.

Lincoln, Ill.—Council has passed an ordinance for construction of a sewer on Broadway from Ladue to Beacon streets.

Prophetstown, Ill.—Town has ordered \$7,000 sewer constructed in Locust street.

Rock Island, Ill.—City Engineer Wallace Treichler has completed plans for system of sewers in the Sixth Ward.

Indianapolis, Ind.—Council has ordered sewers constructed in Layman and Carey's Irvington addition; a main sewer in Riley avenue, with branch sewers in all alleys; cost, \$15,000; also sewers in Dearborn street; cost, \$2,500.—Blaine Miller, City Engineer.

Madison, Ind.—An engineer has been selected to make a survey of city, and report back to Council on the advisability of con-

structing a sewerage system.—Geo. F. Harper, City Clerk.

South Bend, Ind.—The Board of Public Works has rejected bids for a pipe sewer on West Wayne street from Taylor to Franklin, as they were too high.

South Bend, Ind.—Council has ordered a sewer on Elm street.

Thorntown, Ind.—A water works system to cost \$10,000 will be installed here.

Davenport, Ia.—City Engineer Wallace Truckler has plans for sewer systems in the Sixth and Ninth Wards.

Burlington, Ia.—Bids will shortly be received for a 15-inch sanitary sewer in Washington street from Central to Marshall avenue.—F. L. Unterkircher, Mayor.

Council Bluffs, Ia.—Engineer S. L. Etnyre has prepared plans for 6,000 feet of 8, 10, 12 and 15-inch vitrified pipe sewer.—A. W. Cassidy, City Clerk.

Davenport, Ia.—Council has received a petition for a sewer in Myrtle street.—Hugh Moeller, Clerk.

Iowa City, Ia.—J. O. Schulze, City Engineer, is preparing plans for 1,300 feet of 8-inch sanitary sewer.

Oelwein, Ia.—A sewer will be constructed from the Great Western Railway sewer outlet to city disposal plant.

Hutchinson, Kan.—City officials have decided to complete the construction of the drainage canal, or the necessary improvements to make it a complete drain.

Winnfield, La.—City will construct septic tank sewer system; will require about 15,000 linear feet of 12-inch sewer.—J. D. Pace, Mayor.

Baltimore, Md.—The Colonial Park Estates, John J. Watson, President, 763-769 Calvert Building, will lay about 3,000 feet of storm water drains, varying in size from 8 to 15 inches, and about 4,800 linear feet of vitrified sewer pipe, varying in size from 5 to 6 inches.

Fitchburg, Mass.—The question of removing the sewage from Nashua River is under consideration; the work will involve separation of sewage and surface water, and will cost about \$1,000,000.

Lynn, Mass.—City Engineer Leland has submitted a report on draining the district in which Michigan avenue is the center; he has prepared two plans; the first is to build a conduit from Floating Bridge Pond to ocean by way of Eastern avenue, at a cost of \$50,000; the second, by connecting Floating Bridge Pond with Flax Pond and diverting the waters of Jackson's Brook into Floating Bridge Pond, thence into Flax Pond and by Strawberry Brook to the sea at a cost of \$20,000.

Nahant, Mass.—Plans have been completed for constructing the Bass Point sewer; estimated cost, \$5,226.

Detroit, Mich.—Council has directed the Department of Public Works to advertise for proposals for construction of vitrified crock pipe sewer through an alley.—J. J. Haarer, Commissioner.

Grand Rapids, Mich.—Engineer Anderson has plans for new storage pumping stations which will be used in connection with the flood wall construction.

Grand Rapids, Mich.—City Engineer Anderson has reported that good progress has been made in securing the right-of-way for the big east side trunk sewer.

Hamtramck, Mich.—The citizens have voted \$32,000 bonds for extension of water mains, and \$10,000 to build main sewers on Lumpkin and Conant avenues.

Ypsilanti, Mich.—Council has ordered the construction of a sewer on Bell street.

Poplar Bluffs, Mo.—E. C. Nickey, City Engineer, is preparing plans for construction of fourteen blocks of vitrified pipe sewers.—N. A. Spence, City Clerk.

Springfield, Mo.—Council has authorized the City Engineer to have plans prepared for a storm sewer system.

Billings, Mont.—Bids will soon be asked for about 6,052 feet of 8-inch lateral sewers.

Asbury Park, N. J.—The question of constructing a sewerage system through Neptune Township is under consideration.

Jersey City, N. J.—Council has appropriated funds for the extension of James avenue from Dey street through to St. Paul's avenue.

Perth Amboy, N. J.—Council has ordered a sewer in Fox Hill Road with necessary branches; 12-inch pipe, distance, 1,650 feet; Grace street, 24-inch pipe, 340 feet; Sheridan street, 1,920 feet; Goodwin street, 12-inch pipe, 400 feet, and a 12-inch sewer in Bertrand avenue; all will empty into Raritan River.—Wilbur La Roe, City Clerk.

Trenton, N. J.—Council has ordered a sewer constructed in Tyrell avenue from a point 75 feet from Clinton avenue to Assanpink street.—H. B. Salter, City Clerk.

East Las Vegas, N. M.—R. B. Rice, of East Las Vegas, is preparing plans for a sewerage system; cost, \$100,000.—J. K. Goodall, Mayor; Chas. Tamme, City Clerk.

Binghamton, N. Y.—John A. Giles, City Engineer, has completed plans for a sewer to extend from the Innes-Demarest factory

to Clinton street; bids will soon be invited.

Buffalo, N. Y.—Council has ordered plans and specifications prepared for 27 and 24-inch brick and 20, 15 and 10-inch tile sewer in Genesee street; 15 and 12-inch vitrified tile sewer in Zeller street; 36, 33 and 24-inch brick and 20 and 18-inch vitrified tile sewer in Angle, Tyler and Flower streets and along easement of D., L. & W. R. R.; 18, 12 and 10-inch tile sewer in Tyler street; 15 and 10-inch tile sewer in other portions of Flower and Tyler streets, and 15, 12 and 10-inch tile sewer in Custer street.

Corning, N. Y.—Council has approved an appropriation of \$10,000 for new sewers.

Newtown, L. I., N. Y.—The Board of Local Improvements has passed resolution for construction of a temporary relief sewer and pumping plant to connect the St. Nicholas avenue sewer at Grove street, Ridge-wood; cost, \$8,000.

Richmond Hill, L. I., N. Y.—The Board of Trade has decided to lay a sewer, by private contract, in Jamaica avenue, from Lefferts avenue to Union Place at Brooklyn Hills, a distance of 4,500 feet; a committee has been appointed to get bids from contractors; the estimated cost is \$25 per 20-foot lot.

Woodmere, L. I., N. Y.—The Woodmere Land Association is considering the construction of a system of sewers on its property, with a disposal plant on the shore of Woodmere Bay.

Barium Springs, N. C.—The Presbyterian Orphans' Home contemplates installing sewer system.—Rev. John Wakefield, Superintendent.

Mount Airy, N. C.—The Mount Airy Sewerage Company has been incorporated with \$10,000 capital stock by Rev. R. D. Haymore and others.

Williston, N. D.—H. R. Evans, of Williston, is preparing plans for the construction of a sewerage system; cost about \$12,000.—W. T. Poe, City Auditor.

Ashtabula, O.—Council has voted to lay trunk sewers and house connections in the new sewer district No. 3.—F. W. Wagner, Clerk of Council; L. A. Amsden, City Engineer.

Dayton, O.—City Engineer Cellarius has sent a request to the members of the State Board of Public Works for permission to run a 12-inch sewer pipe into the canal; it is to start from the end of the brick paving on Ludlow street, opposite Stout street.

Logan, O.—F. C. Grove, Clerk, has announced that the legislation for the construction of sewers on North street has passed Council and that bids will soon be invited; vitrified sewer pipe, Portland cement will be used.

Louisville, O.—The question of constructing a sewerage system and sewage disposal plant is under consideration.

Middletown, O.—N. E. Jones, Chairman Sewer Commission, will report next week on the work in connection with the proposed sewer construction in this town.

Piqua, O.—Council has received a resolution from the Ordinance Committee providing for sewers in East Piqua.

Piqua, O.—The State Board of Health, Columbus, has received plans for a sewage disposal plant for Piqua.

Steubenville, O.—Council has passed resolutions for the paving and sewerage of a dozen streets.

Cherokee, Okla.—City will vote an issue of \$40,000 bonds to construct sewer system.

Guthrie, Okla.—City Council has instructed the City Clerk to advertise for bids for the construction of district sewers Nos. 42, 43 and 44; plans and specifications filed by the City Engineer being approved.

Muskogee, Okla.—City will have plans and specifications for storm and sanitary sewers ready in a few days; \$250,000 to be expended on brick and cement storm sewers and \$50,000 for sanitary sewers of tile.—T. H. Martin, Mayor.

Muskogee, Okla.—Council has passed ordinances for extension of sewer system in several streets.—M. Caraway, City Clerk.

Portland, Ore.—A sewer system will be constructed in Sellwood at a cost of \$100,000.

Portland, Ore.—No bids were received for a sewer to be laid on First, James, Abernathy and Lane streets.

Cambridge Springs, Pa.—The State Health Department has directed the borough to prepare to establish a sewage disposal plant.

Clintonville, Pa.—The State Health Department has directed the borough to prepare to establish a sewage disposal plant.

Darby, Pa.—The boroughs of Darby, Sharon Hill and six others will probably erect a combined sewage disposal plant, filter beds, pumping station, etc., at a point one mile below Darby; cost \$80,000.—Borough Engineer A. F. Damon, Jr.

Erie, Pa.—The proposed sewerage system to be constructed in the southwestern section of the Sixth Ward will cost \$44,000.—Benjamin E. Briggs, City Engineer.

Harrisburg, Pa.—Select Council has ordered the construction of sewers in fourteen streets.

Johnstown, Pa.—Council has received an ordinance authorizing an appropriation of \$15,000 for securing assistance in the preparation of plans for sewer and river improvements.

McKeesport, Pa.—The State Board of Health has authorized the city to extend its sewer system.

Philadelphia, Pa.—Bids will be received by the South Jersey Realty Company, Room 918, Real Estate Trust Bldg., Philadelphia, for constructing a sewage disposal plant and for laying pipes.

Scranton, Pa.—Town Council has passed an ordinance for the construction of storm sewers and sanitary sewers in the Borough of Winton.—T. J. Hughes, Secretary.

St. Clair, Pa.—The State Board of Health has directed the borough to prepare for sewage disposal.

Winton, Pa.—Town Council has passed an ordinance providing for the construction of a system of storm water sewers and sanitary sewers in the Borough of Winton, to be known as the First Sewer District.—T. J. Hughes, Secretary.

Charleston, S. C.—Plans have been made for the extension of sewerage all over the city; \$250,000 bonds will be issued.

Newberry, S. C.—The Commissioners of Public Works have decided that it will cost \$45,000 to complete Newberry's sewerage system.

Rock Hill, S. C.—City will vote, November 19, on issuance of \$250,000 bonds to construct sewer system and maintain water works.

Trenton, Tenn.—City is discussing the construction of a sewer system.

Houston, Tex.—City has voted \$225,000 bonds for construction of sanitary sewers and \$225,000 for construction of storm sewers.—H. B. Rice, Mayor.

Houston, Tex.—Taxpayers will vote on issue of \$500,000 sewer bonds.

San Antonio, Tex.—William Sinclair, Box 828, invites bids for construction of sewer and drainage system 775 feet long.

Salt Lake City, Utah.—Council has instructed Louis C. Kelsey, City Engineer, to prepare plans and estimates for a storm sewer system; about \$500,000 will be necessary to start the proposed improvement.

Salt Lake City, Utah.—Council has been urged to put in a system of storm sewers as the only means of getting rid of mud and surplus water that comes down from the hill upon Brigham street and First South street.

Richmond, Va.—City Engineer C. E. Bolling has recommended the construction of a sewer through the Hollywood and Clarks Spring property; cost, \$12,500.

Norfolk, Va.—City is being urged to install sewerage and water pipes on West-over avenue.

Racine, Wis.—Council has ordered construction of a sewer in Racine street from De Kovan avenue to Twenty-first street; also in Carter street; also a catch basin on Good street.

Winnipeg, Man., Can.—A sewer will be constructed in Lombard avenue from Main street to the river; cost, \$11,224.—C. J. Brown, City Clerk.

WATER SUPPLY

Birmingham, Ala.—In order that the local water company can make provision to supply more and better water to a greater city, Bridgeton, heretofore a most prosperous, little agricultural community in the northeastern part of Jefferson county, is dissolving rapidly, and before many months have passed will be the bottom of a monster lake from which water will be pumped to the city.

Mesa, Ariz.—Town is discussing a new water works system; Civil Engineer Knipe urges the building of a steel tank of 100,000 gallons capacity, water being distributed through pipes of different dimensions throughout the city; Civil Engineer Fuller, on the other hand, wants a steel tower holding 130,000 gallons and supplied with water from a centrifugal pump.

De Queen, Ark.—City will issue \$25,000 bonds for the construction of water works.—J. E. Brown is Secretary Improvement Board.

Long Beach, Cal.—City is discussing issuing bonds for establishing a municipal water system.

Pasadena, Cal.—Petitions are being circulated asking Council to call another municipal water election and the water company to renew the option; Secretary Wm. Easterbrook is a prime mover.

Sausalito, Cal.—City has voted \$100,000 bonds for a municipal water works system.

Sonora, Cal.—City is discussing the construction of a water system for fire fighting purposes.

Stockton, Cal.—Harry T. Compton, Consulting Engineer, who was engaged by the Southside Promotion Committee to investi-

gate project of installing electric motors to be used for irrigation purposes, has submitted a report advising the use of electricity in connection with the work.

Brunswick, Ga.—This city has voted to grant a 10-year contract to F. D. M. Strachan and associates for light and water, provided they construct 4 miles of electric railway and have same in operation within one year.

Kamiah, Ida.—Jas. Carlisle, of Kamiah, is preparing plans for water works; cost, about \$5,000.

Joliet, Ill.—Business men of the downtown district are circulating a petition for a high-pressure water system.

Joliet, Ill.—The Spring Creek Drainage Commissioners have presented a request to Council for permission to lower the city water mains which cross Spring Creek at Cass street.

Roanoke, Ill.—Town is discussing construction of water works.

Springfield, Ill.—Plans for the construction of a filter plant with a daily capacity of 8,000,000 gallons, are being prepared.—F. H. Hamilton is City Engineer.

Fort Wayne, Ind.—The Board of Water Works has granted a petition for water main extensions on Oakland street.

Hazlet, Ind.—The Federal Government will spend \$50,000 in repairing the Grand Rapids lock and dam.

Hammond, Ind.—Council is considering plans for improving the water supply by a filtering system.—Jacob Kasper, Superintendent of Water Works.

South Bend, Ind.—Council has ordered a 4-inch water main placed in Forest avenue.

Winterset, Ia.—The citizens voted to issue \$60,000 bonds for the construction of water works. W. K. Palmer Company, Dwight Building, Kansas City, Mo., are Engineers.

Falmouth, Ky.—City will vote November 3 on issuance of \$5,000 water pump, bridge repair and guttering bonds.—The Mayor.

Vinton, La.—The Sabine Canal Company, of Vinton, is making surveys, with a view to extending its present 12-mile canal another 10 miles; also to increase the capacity of its pumping plant.

Bangor, Me.—City is contemplating the purchase of the present water works system or build a municipal one.

Williamsburg, Mass.—Treasurer states that no definite decision has been arrived at with regard to the proposed new and larger dam. There is now a small reservoir at Searsville and the company is now acquiring the necessary land for flowage.—S. W. Lee of Florence, Treasurer of Hampshire Reservoir Company.

Grand Rapids, Mich.—The Board of Public Works has recommended the extension of water main in Ninth street, cost, \$150; water main in Henry street, cost \$345, and also in Creston court, cost \$410.

New Ulm, Minn.—Council is arranging to build reservoir.—Ernest Wicherski, City Clerk.

Spooner, Minn.—Specifications are being prepared for a \$15,000 water system for which bonds have been voted.

Spooner, Minn.—\$15,000 in bonds have been voted for water supply.

Ittabena, Miss.—Xavier A. Kramer, of Magnolia, has prepared plans for the construction of a \$25,000 water system; the contracts will be let as soon as the bonds are sold.

Hattiesburg, Miss.—City Council is considering the question of issuing \$40,000 bonds for extending water mains and improving the streets.

Ittabena, Miss.—Citizens have voted \$25,000 for a water works system.

Carl Junction, Mo.—A committee composed of H. R. Chetwood, H. C. Robertson and Charles Roney will inspect the water plants of Oswego and Alba in order to secure data for the erection of a water plant here.

Kansas City, Mo.—The Water Board is considering the question of laying a 30-inch feed line from the Turkey Creek pumping station.

Kansas City, Mo.—The Water Board is contemplating laying a 30-inch feed line from the Turkey Creek pumping station.—J. L. Darmel, City Engineer.

Hebron, Neb.—An election will be held in December to vote on issuing \$11,000 bonds for the construction of water works.

Hebron, Neb.—An election will be held in December to vote on issuing \$11,000 bonds for the construction of water works.

Walshill, Neb.—Council is considering the question of water works.

Camden, N. J.—The Stone Harbor Water Company, of Camden, has been incorporated to operate water works in Stone Harbor and the lower portion of Seven-Mile Beach in Middle Township, Cape May County, N. J.; capital, \$50,000; incorporators are: L. Starr, Woodbury; E. C. Waddington, Woodstown; W. S. Casselman, Jr., Camden.

North Arlington, N. J.—An election will be held December 1 to vote on issue of

\$25,000 bonds for installation of a water supply.

Ballston Spa, N. Y.—Bids will be received October 31, noon, for the sale of \$8,000 4½ per cent. annual, extended water bonds.—Donald McLennan, Village Treasurer.

Canandaigua, N. Y.—The Board of Water Commissioners has requested an appropriation of \$35,000 to be used for installing two motor-driven centrifugal pumps, 2,500,000 gallons capacity each; bids will be asked as soon as the appropriation is granted; electric power from the Ontario Light and Traction Company will be used to operate the pumps.

Newburgh, N. Y.—William J. Blake, City Engineer, is preparing plans for increasing capacity of the storage reservoir, the work to consist of raising Washington Lake dam three feet above the present elevation; increasing the area of the lake by 8.46 acres, and adding 150,000,000 capacity; removing slope pavement on Cayler dam, c.-i. pipe and general construction.

New York, N. Y.—Bids will soon be asked by the Department of Water Supply, Gas and Electricity for the extension of the high pressure fire system.—John H. O'Brien is Commissioner.

Roosevelt, N. Y.—The Roosevelt Water, Power and Light Company has been incorporated, with a capital of \$40,000. Incorporators: E. Uhe and A. Whitehouse, of Roosevelt, and C. E. Whitehouse, of Hempstead.

Boone, N. C.—This city is contemplating the construction of water works.—Benj. T. Brannocks.

Athens, O.—The State Board of Health has approved plans for water works for Athens.

Bellfontaine, O.—The Tidewater Pipe Line will erect a pumping station to cost \$100,000.

Cambridge, O.—City is discussing the question of a fresh water supply.

Chardon, O.—Dorton Village has purchased a lot, 30 feet frontage, on Main street to be used for a location for their new water works system.

Coalton, O.—The State Board of Health has approved plans for water works.

Columbus, O.—An ordinance has been passed by Council for the issue of \$75,000 4½ per cent. water improvement bonds.—John T. Barr, Clerk.

Dayton, O.—The Servers urge immediate action on the report of Arthur Geisler, as some definite plan for extending the water supply must be adopted shortly in order to supply the continually increasing demand.

Dayton, O.—Council is discussing the erection of an auxiliary pumping station at the intersection of the Stillwater and Miami rivers in Riverdale and construct a belt line of water mains according to the plan of Server Pauch; estimated cost, \$250,000.

East Liverpool, Ohio.—All bids for laying a 6-inch standard water main in Sixth street, from Jefferson to Monroe street, to Fourth street, etc., were rejected on October 21 by the Board of Public Service as excessive; line will be laid by the department. A. S. Hughes is Clerk of Board.

Findlay, O.—The City Council has granted the Board of Public Service permission to install pumps at Limestone Ridge, at a cost of \$5,500.

Piqua, O.—The Board of Public Service unanimously favor a well system as the only system by which Piqua can secure a pure and adequate water supply.

Mansfield, O.—E. G. Bradbury, of the engineering firm of Bradbury & Shute, of Columbus, has notified the city that the water supply can be increased more than one-half by utilizing the Hedges spring.

Malta, O.—Plans have been approved by the State Board of Health for water works for city.

Newton Falls, O.—The State Board of Health has approved plans for the new water supply plant.

Portsmouth, O.—City proposes to install a water works system.

Wilmington, O.—Plans have been approved by the State Board of Health for a new water supply system.

Youngstown, O.—Members of the Legislative Committee of City Council have not as yet acted on the application of the Mahoning Water Company for a franchise to lay water pipes in the East End for industrial plants.

Youngstown, O.—Councilman Fithian is urging the installation of new engines at the water works pumping station.

Youngstown, O.—The Board of Public Service has presented to Council a report on water extension in a number of streets; estimate, \$17,605.

Cherokee, Okla.—A second election will be held to vote on the question of issuing \$65,000 water works and sewer bonds.

Erick, Okla.—This city will soon vote on \$20,000 bond issue for water works.—A. G. Gillum, Mayor.

Hugo, Okla.—Town has floated bonds for

\$150,000 and will have a municipal water plant.

Muskogee, Okla.—City will extend water works, including construction of pump station and low-service pump and high-duty pump, together with four and one-half miles 24-inch main; several miles 12-inch and several miles 8-inch main; plans and specifications to be ready within a few days.—T. H. Martin, Mayor.

Altoona, Pa.—Harvey Linton, Civil Engineer, has inspected the Juniata Borough reservoir at Homer Gap and the plans and specifications for its improvement.

Charleroi, Pa.—The Charleroi Water Company is considering ways and means of securing a pure water supply.—Address Secretary.

Quarryville, Pa.—Citizens will vote on issue of \$25,000 bonds to purchase the water works system or construct one.

Washington, Pa.—All bids submitted October 19, for construction of a water plant at the sewage disposal works have been rejected, as the money from recent sale of bonds has not yet been received; new bids will be called for.—J. K. Weir, Secretary, Town Council.

Reading, Pa.—The Philadelphia and Reading Railway Company (Geo. F. Baer, President, Philadelphia) is considering the building of a large dam at Gordon, a pump at Schuylkill Haven and several other water improvements in the coal region towns.

Warren, Pa.—Bids will be received by the Committee designated by the Board of Trustees of the State Hospital for the Insane, Warren, for furnishing and installing two 80-horsepower natural gas engines; and for furnishing and installing two triplex power pumps of approximately 955 gallons per minute capacity.—Charles R. Simpson, Engineer State Hospital.

Caldwell, Tex.—The City Council has decided that there should be another and larger well for the city water works, and it will be located at the depot, near the stand pipe.

Houston, Tex.—Taxpayers will vote on issue of \$100,000 water main bonds.

Nashville, Tenn.—The City Council has passed the ordinance appropriating \$60,000 for purchasing and laying water pipes in the suburban territory.—W. W. Southgate is City Engineer.

North Ft. Worth, Tex.—The question of issuing \$20,000 in bonds for improving water system in North Ft. Worth will be submitted to a vote of people November 18.—John F. Grant, Mayor.

Rosebud, Tex.—The city will vote on issue of \$20,000 bonds for the construction of water works.

Victoria, Tex.—Jules Leffland, of Victoria, has prepared plans for reservoir recently mentioned; depth, 15 feet; inside diameter, 100 feet; reinforced concrete; capacity, 882,000 gallons; cost, \$5,000; bids have been received on excavation, 500 barrels of cement and other materials required in construction; William Wheeler, Superintendent of Water Works and Sewers, will supervise erection.

Lehi, Utah.—Council has passed ordinance providing \$50,000 bonds for the new water works system.

Ogden, Utah.—Bids will be received November 16 for the purchase of \$450,000 4 per cent. 20-year water works bonds.—E. P. Brown, City Recorder.

Bedford City, Va.—The Jeter Hill Water Company, incorporated to furnish water supply, will soon let contract for machinery and equipment.—Don E. Parker, Secretary.

Norfolk, Va.—T. B. Dornin, Chief Engineer of Water Department, has recommended to Board of Control a system providing for better and natural filtration of city's water supply; natural filtration can be obtained by vacuum system of driven wells, air-lift system of wells, system of open wells, with well points or drainers driven out from sides, or subsoil drains leading into system of collecting wells or basins; cost, \$3,000.

Richmond, Va.—City will, it is reported, proceed to construct proposed flume for settling basin.—Charles E. Bolling, City Engineer.

Grand Rapids, Wis.—Superintendent of Water Works and the Water Commission are investigating the question of laying a special main to supply the manufacturing district with river water.—C. E. Boles, City Clerk.

Grand Rapids, Wis.—C. E. Boles, City Clerk, states that the Superintendent of Water Works and the Water Commissioners are investigating the question of laying a special main to supply the manufacturing district with river water.

Aberdeen, Wash.—The Superintendent of the Water Works has recommended the construction of reservoir.—S. B. Linn, Superintendent.

Seattle, Wash.—R. H. Thomson, City Engineer, has submitted estimates for local improvements as follows: Sixth avenue, N. E., and other streets, fire hydrants, \$6,610; Fifteenth avenue and other streets, water

main, \$7,150; Sixteenth avenue, N. W., and other streets, water mains, \$15,300; Eighteenth avenue, N. E., and other streets, water mains, \$7,200.

Tacoma, Wash.—Council has ordered the construction this winter of two reservoirs with a capacity of about 20,000,000 gallons.—Frank L. Davis, City Engineer.

Tacoma, Wash.—Council has granted two extensions of water mains.

Cumberland, Wis.—The pumping engine at the city water works has been destroyed by explosion.

New Liskeard, Ont.—Bids are wanted for the purchase of \$15,000 bonds to be used for the extension of the water works.—H. Hartman, Town Clerk.

LIGHTING AND POWER

Dothan, Ala.—The Choctawhatchie River Light and Power Company have been incorporated; capital, \$1,000,000; company will build dam and develop water power. Incorporators: W. C. Frither, A. C. Kelly, G. S. Kelly, W. H. Clark, G. W. L. Smith and A. J. Smith.

Montgomery, Ala.—C. E. White, of Boston, Mass., has purchased the ice and power plant and attendant franchises of the D. P. West estate and will improve the plants and organize a company of local business men which will take charge of the property.

Thatcher, Ariz.—The citizens are considering the question of establishing an electric light plant.

Rogers, Ark.—The Rogers Light and Power Company will extend and improve its lighting system.—J. E. Felker, Manager.

Red Bluff, Cal.—Work will be started soon on the power plant to be erected by the Northern California Power Company on the Hazen property.—E. D. V. Johnson, Manager, San Francisco.

San Francisco, Cal.—The Mojave Water and Power Co., capitalized at \$20,000,000, which will furnish light, power and water throughout the southern part of the State, has filed articles of incorporation.—C. S. Goodrich of San Francisco, Harry C. Mack of Oakland, and others, directors.

Sausalito, Cal.—The Marin Gas Co. is considering the construction of a gas plant here to cost about \$45,000.

Boulder, Colo.—A mortgage to secure a bond issue of \$8,000,000 by the Northern Colorado Power Company has been filed in the office of the County Clerk; the instrument recites that the issue is to retire \$3,000,000 of bonds already outstanding and to provide for extensions and betterments throughout the counties in which the company is operating; the company is supplying power and light for all of the important cities and towns of northern Colorado and Southern Wyoming and it is its purpose to extend its lines and branches to every section of this territory.

Boulder, Col.—The Eastern Colorado Power Company, a subsidiary of the Central Colorado Power Company, of Colorado Springs, has decided to construct a masonry dam at Cheesman Lake, several miles above the city of Boulder, to store water for power purposes, to cost about \$1,500,000.

Brunswick, Ga.—This city has voted to grant a 10-year contract to F. D. M. Strachan and associates for light and water, provided they construct four miles of electric railway and have same in operation within one year.

Jasper, Fla.—The Jasper Water and Light Company will purchase another dynamo during the coming year.

Port Inglis, Fla.—W. N. Camp and R. C. Camp, President and General Manager of the Florida Power Company, Ocala, intend to develop water power property near Port Inglis, as reported recently; plan involves construction of dam and electric plant on Withlacoochee River.

Sarasota, Fla.—H. P. Porter, President and Manager Sarasota Ice and Power Company, recently received electric light franchise, and contemplates instalment of plant of 1000 or 1500 lights; to have 30-year contract with city.

White Spring, Fla.—The Suwanee River Railway and Power Company will be organized with capital stock of 3,000,000 to develop water power and build electric plant on Suwanee river, three miles from White Spring; plan involves generating and transmitting 25,000 horsepower by electricity to various cities for lighting and power. D. G. Zeigler, Empire Building, Atlanta, Ga.; Jasper R. Walker, White Spring; J. H. and W. L. Phillips, Jacksonville, Fla.; N. Johnson, White Spring, incorporators. D. G. Zeigler & Co., Empire Building, Atlanta, Ga., engineers in charge, expect to take bids on construction work in sixty days.

Hawkinsville, Ga.—An election will be held to vote on the question of issuing \$15,000 electric light bonds.

Lyons, Ga.—On account of legal technicalities the city will again vote on bond

issue for construction of water works and electric light plant; contract for construction was recently awarded to W. J. Edwards & Co., National Bank Building, Atlanta.

Boise, Ida.—Articles of incorporation have been filed for the Teton River Light and Power Company, of St. Anthony; capital stock, \$1,000,000. G. E. Bowerman, John Donaldson, Charles Watson, T. W. Lee, J. C. Clay and J. H. McCoster, incorporators.

Bonnero Ferry, Ida.—J. S. Drumheller, Spokane, Wash., is making arrangements for the construction of a hydro-electric plant at Moyle Falls, eight miles from Bonners Ferry; the plant will furnish electricity in Sandpoint, Bonners Ferry and the mines within fifty miles of the falls; J. F. Reynaud, of Sandpoint, will have charge of construction of the plant.

Sand Point, Idaho.—Moyle Falls on Moyle River will be developed, and the transmission of the electricity to Sand Point.—J. L. Drumheller, Spokane, Wash.

Cairo, Ill.—Council has ordered lights placed at Fairground avenue and at Thirteenth and Ritterskajup avenue.

Chicago, Ill.—The Cosmopolitan Electric Company will construct a power plant; cost, \$300,000.

Woodstock, Ill.—It is proposed to install at the municipal electric light plant one 400 kw. direct connected dynamo.

Ossian, Ind.—Citizens have granted the Fort Wayne and Wabash Company a franchise for lighting town; town will build substation.

Cedar Rapids, Ia.—A dam across the Cedar River, to furnish power for a 5,000-horsepower plant, is requested in a petition made to Council; the dam is proposed to be erected above the Fallsades; it is to be used for generating electricity; an auxiliary steam plant is to be provided for emergencies.

Wichita, Kan.—The Wichita Street Railway Company is to extend three of its lines; the stock yards line, the Pattle avenue line and the Cleveland avenue line.—General Manager Chubbuck.

Albany, Ky.—Five of Albany's citizens have formed a stock company and will install a first-class light plant.

Slidell, La.—The Slidell Light and Manufacturing Company will purchase the Salmon Brick, Light and Lumber Company plant.

New Orleans, La.—Hotel Grunewald Company, Ltd., has been authorized by Council to construct and operate plant for generation of electric energy for lighting, heating and power purposes.

Baltimore, Md.—Washington, Baltimore the Annapolis Electric Railway Company, 108 North Liberty street, will install additional electrical apparatus.

Breathedsville, Md.—The Antletam Electric Light and Power Company, Boonsboro, Md., will expend \$15,000 to develop water power; fall of about ten feet, and estimated that 200 horsepower can be obtained; company has built penstock of solid masonry, using 200 barrels of cement, and constructed six miles of wiring, which will transmit power and light to Boonsboro and other cities; 75-kilowatt generator, purchased from Western Electric Company of Chicago and other cities, is being installed; two 39-inch turbines have been installed by S. Morgan Smith Company, York, Pa.; H. L. Moser prepared plans, and O. E. Shiffer is engineer in charge.

Battle Creek, Mich.—Council has received petition for lights to be installed at corner of College and Barbour streets and corner of Riverview and Magnolia avenues.

Grandledge, Mich.—The village has voted to sell its electric lighting plant to the Commonwealth Light and Power Company, of Jackson; village will buy power of and be lighted by the Commonwealth Company.

Grand Rapids, Mich.—Monroe street merchants are rapidly pushing the project for a more attractive and better illumination of that thoroughfare.

Aurora, Minn.—Council is discussing the installation of an \$8,000 electric light plant.

Redwood Falls, Minn.—A. C. Burmeister secured a 15-year franchise for electric light, heat and power; the water power will be developed to its full capacity.

Mahnomen, Minn.—Propositions will be received for the construction of a municipal electric light plant.—A. O. Vachon, Village Recorder.

Geneva, N. Y.—The Geneva-Seneca Electric Company is contemplating an addition to its plant.

Huntington, N. Y.—The Huntington Light and Power Company will construct an addition to its power house and will install a 500-kw. turbo-generator set and other necessary equipment; an issue of \$50,000 in bonds will be made, the proceeds to be used to pay for the proposed improvements.—Edgar L. Street, 44 Wall street, New York City, Manager.

Beaufort, N. C.—Bids will be received December 1 for \$20,000 of 30-year electric

light and drainage bonds.—C. S. Maxwell, Town Clerk.

Cameron, N. C.—The Regal Hosiery Mills Company will operate electric light and power plant.

Hendersonville, N. C.—Geo. Stephens, Charlotte, will install electric power plant at Kanuga Lake Country Club, near Hendersonville; to furnish light to community and power for operating small woodworking plant.

Newbern, N. C.—The property of the Newbern Lighting and Fuel Company, at Newbern, being the gas plant, including the real estate, plant, fixtures and franchises, and all other property belonging to the Newbern Lighting and Fuel Company, will be sold to the highest bidder for cash at noon, November 23.—Geo. A. Nicoll, Receiver.

Manchester, N. C.—Little River Power and Transmission Company, incorporated with \$100,000 capital stock, has awarded contract to Thomas B. Whitted Company, Charlotte, N. C., for erection of power plant and for equipment; Little River company has franchise for lighting Manchester, and will operate electric street railway system at Fayetteville.

Amherst, O.—New machinery will be installed in the municipal light plant of this city.

Bucyrus, O.—Bids will be received November 20 for the purchase of \$84,000 electric light bonds.—Aug. Broenne, City Clerk.

Toledo, O.—Council has ordered the improvement, by lighting with electric light, of Bancroft, Chestnut and Sibley streets and Lawrence avenue.—John M. Babcock, Clerk.

Stigler, Okla.—The Stigler Light and Power Company, R. E. Stalcup, President, will establish electric light plant and contemplate installing ice machinery about January.

East Greenville, Pa.—A company is being formed to build an electric light plant in East Greenville and supply that borough and Red Hill.

Erie, Pa.—The Edison Electric Lighting Company has decided to erect a large addition to its power plant.

McKeesport, Pa.—Alexander Potter has recommended the installation of a lighting plant at the water works; cost \$3,500.

Stoyestown, Pa.—Stoyestown and Spruce-town will be lighted this winter by electricity, according to the men at the head of a new light company recently formed and granted a franchise; a plant will be located between the two towns and work on its construction will be started soon; the poles are being planted along the principal streets of the town. The officers of the company are: President, Daniel Long; Secretary, Valentine Muller, and Treasurer, Earl Fulton.

Blacksburg, S. C.—City is considering election for voting on issue of bonds to construct electric lighting system.

Conway, S. C.—Company has been organized to construct electric light plant.—D. A. Spivey, President; Paul Quattlebaum, General Manager.

Vienna, S. D.—Council has been petitioned for franchise to establish an electric plant.

Austin, Tex.—The Board of Regents, University of Texas, contemplates erection of power plant.

Cuero, Tex.—Cuero Light and Power Company, incorporated with \$100,000 capital stock by O. T. McAllister of Cuero; W. M. Ratcliffe, Brownsville; Dan J. Hayes, Houston.

Dallas, Tex.—E. A. Worden and D. M. Jones, who are interested in the People's Ice Company, have applied for franchise to construct, operate and maintain electric light, heat and power supply system.

McKinney, Tex.—The city will extend electric light system; W. E. McKinnon, Dallas, Superintendent of municipal water works and electric light system.

Bedford City, Va.—Council will consider proposition for construction of electric power plant; proposed to organize company with \$65,000 capital stock, acquire dam and acreage on James river and transmit 1000 horsepower to Bedford City, probably for distance of twenty-five miles.

Bedford City, Va.—A strong movement has been inaugurated to secure an electric power plant to deliver 1,000-h.p. at Bedford City; it is proposed to generate the electricity at an available water-power site on the James River where there is a fall of 17 ft. and it is estimated that the present dam will generate 1,200-h.p.; a power plant is to be installed, with all modern devices for the economical production of power, and this power transmitted to Bedford City, which is distant about 25 miles from the dam; a meeting of Council is to be held at once to investigate the matter.—Address City Clerk.

Petersburg, Va.—A committee, Jas. C. Burrow, Secretary, will consider ways and means by which the proposed electric route between Petersburg and Richmond electric

properties and the Norfolk and Portsmouth electric properties at each end of the "Cotenary" link could be aided in the county and indeed to pass through Prince George, at some feasible point running through the rich "Peanut Belt," of that and the consecutive counties east to Smithfield.

Bellingham, Wash.—The E. K. Wood Lumber Company will install electric motors to operate the planing mill.—Fred J. Wood, Manager.

Tacoma, Wash.—Council and special designer will select a site on the Nisqually River, as the site proposed on the Dosewallips and Dickabush rivers is not practicable.

Waterville, Wash.—Gray & Barash, of Entiat, managers of the proposed power plant to be constructed at Waterville, state that about \$250,000 will be expended; all work to be done by day labor.

Cumberland, Wis.—The city light plant has been damaged by explosion; loss, \$17,000.

La Crosse, Wis.—C. F. Lang, La Crosse, has applied to the State Railroad Commission for permission to establish a municipal electric light plant in La Crosse.

Neshkoro, Wis.—The Neshkoro Light and Power Company has been incorporated; capital, \$20,000. Incorporators: E. D. Morse, Gustave Dahike, and others.

Madison, Wis.—Wisconsin Capitol Commission invite proposals until November 10, noon, for doing the electric wiring in the East Wing of the State Capitol new building, according to the plans and specifications and under the supervision of George B. Post & Sons, Architects.—Lew F. Porter, Secretary of Capitol Commission.

Milwaukee, Wis.—Council has instructed the Board of Public Works to proceed at once with the erection of the municipal light plant. It is expected that the plant will cost \$1,500,000 when completed.—Chas. J. Poetsch, City Engineer.

Mondovi, Wis.—The Mondovi Light and Power Company has been incorporated, with a capital of \$35,000, by B. S. Lockwood, A. D. Alt, and others.

Santa Rosalia, Mexico.—The Chihuahua State Government has granted to R. J. de Morambert and Henry C. Mayer, President and Secretary, respectively, of the Cia. Productora de Hielo y Electricidad, a concession to build at Santa Rosalia, Chih., an ice plant and an electric light and power plant.

FIRE EQUIPMENT

Alameda, Cal.—The Fire Commissioners will ask for more than \$10,000 to purchase additional apparatus.

San Bernardino, Cal.—City is being urged by the Northwest Improvement Club to provide apparatus for a new company.—G. M. Stephens, Chief.

San Francisco, Cal.—E. W. Rollin & Sons have purchased \$1,000,000 San Francisco fire protection bonds for \$1,095,000.

East Moline, Ill.—Council is arranging to establish a fire department.—F. J. Clendenin, Chairman.

Quincy, Ill.—The Board of Aldermen is discussing the erection of a fire house in the Seventh Ward.

Springfield, Ill.—A new engine house will be erected and an auto fire engine may be purchased.—J. E. Smith, City Clerk.

Columbus, Ind.—City will purchase equipment for the new Orinoc fire house.

Vollmer, Ida.—Council has decided to build City Hall and fire engine house.

Muscataine, Ia.—City will build a hose house on West Hill.

Winthrop, Mass.—Town voters have appropriated \$6,500 for purchase of fire engine, harnesses and other equipment.—A. S. Smith, Chairman of Committee.

Natick, Mass.—City has appropriated \$1,500 to repair engine No. 1 at the central station.

Mill City, Mont.—Council is considering the matter of purchasing fire extinguishers.

Irvington, N. J.—Council has received plans for a new fire house in Coit street.—H. O. Osborne, Chairman of Public Buildings Committee.

Irvington, N. J.—Town Council will order an additional 2,000 feet of hose; also has ordered a hydrant installed on Grove street and 1,000 feet of main; an extra hydrant on Orange avenue and 600 feet of main.

Mendham, N. J.—Town is planning to purchase a hose wagon.

Salem, N. J.—The Merchants and Manufacturers will aid Council in purchasing a fire engine.

Buffalo, N. Y.—Council is discussing the selection of a site on Clinton street for a fire engine house.—H. J. Ballrett, City Clerk.

Greenwich, N. Y.—Town may build a new engine house.

Syracuse, N. Y.—The North Side citizens have petitioned for new fire house.

Castleton, N. D.—The Fire Committee has petitioned for additional hose.—Address City Clerk.

Charlotte, N. C.—The Finance Committee of Council will build new fire station; building will be equipped with hose wagon.—A. H. Wearn, City Clerk.

Baltimore, Md.—The President of the Board of Fire Commissioners has petitioned for an appropriation of \$100,000 for the purchase of fire boat.

Cloquet, Minn.—The Fire Chief has petitioned for 800 feet of hose.—Jos. Loesel, City Clerk.

Hamilton, O.—Council has authorized the purchase of rubber tires for the fire wagons at a cost of \$1,400.

Jewett, O.—Town will secure fire protection for itself.

Marietta, O.—The Board of Safety recommends the improvement of the fire protection of the city.

Youngstown, O.—Council has received a petition from 16 property owners in Hazelton for a fire engine; also for repair of engine now out of service.

Youngstown, O.—Fire and Police Committee has recommended the purchase of an automobile truck for Fire Department.

Sapulpa, Okla.—Council will erect a \$15,000 Fire Department building and jail.

Glenolden, Pa.—The Glenolden Fire Company has purchased site for building engine house.

Fairview, Pa.—Residents of this place and Ferndale propose to form a hose company.

Phillips, S. D.—A fire company will be organized and a chemical engine purchased.—A. S. Anderson.

Knoxville, Tenn.—Council has appropriated \$30,000 for remodeling over the Ninth Ward fire station.

Nacogdoches, Tex.—City will purchase additional equipment for a new fire station.

Warrenton, Va.—A volunteer fire company has been organized.—J. W. Jeffries, Chief.

Odessa, Wash.—City has formed a Fire Department, with C. A. Simpson as Chief.

Walla Walla, Wash.—Council is discussing the purchase of an auto chemical and hose wagon or a \$1,200 hose wagon.

Antigo, Wis.—Council will purchase 1,000 feet of hose.—G. O. Palmiter, City Clerk.

Oshkosh, Wis.—Council will purchase 2,500 feet of hose and automobile for the Fire Department.—John Wetzel, City Clerk.

ELECTRIC RAILWAYS

Huntsville, Ala.—The Huntsville, Chattanooga and Birmingham Interurban Railway, Light and Power Company will shortly begin work on the Jefferson street extension to the mountain, five miles.

Heber, Ark.—Council has granted a franchise to C. F. Crosby to build and operate a street railway system in Heber; Mr. Crosby was granted one year in which to begin work on the line.

W. H. Horton has been given franchise for an electric light plant.

Magnolia, Ark.—Surveys for the proposed Gulf and Magnolia Northern Railroad will begin immediately.—S. Q. Sevier, Secretary, Hope, Ark.

Marianna, Ark.—The Marianna, Aubrey and Western Railway Company has been incorporated with \$100,000 capital by J. T. Robinson, H. F. Roleson and others; company proposes to build a railroad from Marianna to Aubrey, in Lee county; distance, nine miles; company has been granted a 50-year charter.

Hanford, Cal.—Fresno, Hanford and Summit Lake Interurban Railway Company will construct 60 miles of road in Kings and Fresno Counties.—L. A. Nares, Fresno, President.

San Rafael, Cal.—A road will be operated from Sausalito to Mill Valley, Belvedere and San Rafael.—Chas. Murphy, Corte Madera.

Wilmington, Del.—A project for an electric railway to intersect the State from Wilmington to Delmar, paralleling and competing with the Delaware Railroad for both passenger and freight business, is being engineered by capitalists of this and other cities; maps have been prepared and the managers are now securing rights-of-way; proposed route touches New Castle, Middletown, Townsend, Smyrna, Dover, Harrington and Milford, with branches to Lewes and Rehoboth and power houses at Wilmington and Smyrna.

Augusta, Ga.—A committee of Edgefield County citizens, headed by William F. Calhoun, Chairman, will pay a visit to Augusta for the purpose of interesting local capitalists in a project to construct an electric trolley line from Augusta to Edgefield, one of South Carolina's most historic county seats; a contract for the survey work has been awarded.

Chicago, Ill.—A new street railway company, the Chicago and Provido, has been incorporated at Springfield with \$5,000 capital; road is designed to give to the res-

idents of Oak Park and Proviso improved transportation service to Chicago.—F. D. Kilmer, K. M. Johnson and others are incorporators.

Evansville, Ind.—The Directors of the Evansville and Southern Indiana Railroad have decided on construction of a line to connect Evansville and Terre Haute northward from Patoka; also to erect a \$10,000 power plant in Evansville.

Evansville, Ind.—Directors of the Evansville and Southern Indiana Railroad Company, which include interurban lines from Princeton to Evansville and the Evansville street railway system, held their semi-annual meeting recently and decided to push the construction of the interurban line which will eventually connect Evansville and Terre Haute northward from Patoka in the early spring; the directors voted to spend \$10,000 on a power plant in Evansville.

Hammond, Ind.—Capitalists propose to build a new interurban line into Gary, to be known as the Valparaiso, Hobart and Gary line; line will be built as soon as certain franchises are obtained; among those named as being included in those interested are James Hopkins, son of Senator Hopkins, of Illinois; George Earle, who has considerable property in the neighborhood of Gary, and Francis Yeaker, a railroad promoter, who has built various traction lines; Mr. Hopkins has appeared before the Town Board of Gary and asked for leave to operate in the town.

Lake Charles, La.—The Long-Bell Lumber Company will convert its tramroad, which connects with the Lake Charles and Northern, to standard gauge.—Robert A. Long, President; C. B. Sweet, General Manager.

Dowagiac, Mich.—Articles of incorporation have been filed for the Dowagiac Railway Company; incorporators: C. K. Minary, H. S. Grey and Henry C. Mason, of Benton Harbor, Mich.; capital stock, \$200,000; the line will extend from Eau Claire to Dowagiac.

Gulfport, Miss.—The Gulf Coast Traction Company, after being delayed in its plans for several years, is now arranging to extend its line from Gulfport to Pass Christian; road was originally planned to go to Bay St. Louis, but work was stopped because of the refusal of citizens of Pass Christian to allow tracks to be laid on the famous beach drive; compromise has now been brought about whereby the company's tracks will be laid on Second street instead of traversing the Pass Christian beach.

Joplin, Mo.—Council has granted a franchise to the Scullen interests to build a union depot and operate their tracks to it.

Springfield, Mo.—W. A. Bixby, General Manager of the Springfield Traction Company, says that surveys for the proposed line from Springfield to Carthage are being made; if a direct route is chosen it will be 55 miles long, but it may be built via Republic, Aurora, Monett and Pierce City, which would make it 70 miles long; contracts are to be let in two or three months.

Canton, O.—John Monnett, of Canton, is promoting an electric railway between Canton and Youngstown; construction will begin next spring.

Dayton, O.—Attorney Frank Brandon, President of the Dayton, Lebanon and Cincinnati Railroad, has applied to City Council for a franchise to occupy city thoroughfares and to cross a number of streets at grade; company seeks terminals near the Union Railway station and will continue the construction of the steam road from Lebanon Junction to Dayton; line is already completed from that point to Cincinnati via Lebanon.

Dayton, O.—The Dayton, Springfield and Xenia Southern Railway Company has been incorporated to build an electric railway from Xenia to Wilmington and later to Cincinnati; capital, \$10,000.—T. A. Fenneding, of Dayton, President, and R. J. Wells, Vice-president.

Zanesville, O.—The interurban line between Zanesville and Cleveland has been fully financed and work of construction will be commenced within the next two months; the new road will connect this city with Cleveland by way of Cochocton, Orrville, Barberton and Elyria; officers are J. J. Breitinger, President; W. E. Brooks, Elyria, Vice-president; J. H. Knisely, Secretary, and W. E. Ottman, New York, Treasurer.

Carlisle, Pa.—The Cumberland Railway Company will traverse 13 miles of streets in Middlesex County.—W. E. Glatfelter, Balfour, President.

Philadelphia, Pa.—The Philadelphia and West Chester Traction Company is considering the construction of a line from Sixty-ninth street to Media, via Upper Darby, Springfield and Upper Providence townships.

Providence, R. I.—The Rhode Island Company is planning the early rearrangement of lines between Woonsocket and Manville and Woonsocket and Pascoag.

Lemmon, S. D.—The Dakota Southern Railway Company, with headquarters at Lemmon, S. D., and Dickinson, N. D., has been organized with \$90,000,000; the company proposes to construct a line from Rapid City, S. D., to Williston, N. D., by way of Lemmon.

Decatur, Tenn.—The East Tennessee Valley Railroad will be built from Chattanooga to Knoxville, Tenn., or some point on the Tennessee river, and J. W. Stewart will make the survey.

Dallas, Tex.—J. W. Pinson states that charter has been filed for the proposed Gulf, Texas and Western Railway, which succeeds the Dallas and New Mexico Railway, lately sold to Megargel & Co., 5 Nassau street, New York. The proposed line is from a point in Sabine County to Benjamin, in Knox County, 500 miles, via Tyler, Kaufman and Dallas. A branch from Booneville to Forth Worth is contemplated. The incorporators are R. C. Megargel of New York; J. J. Jermyn and R. B. Williams of Scranton, Pa.; Ben B. Cain, Tyler, Texas; L. M. Dabney, Bennett Hill, and J. W. Pinson of Dallas, Texas; J. W. Cain of Chicago and Oliver Loving of Jacksboro, Texas; capital, \$500,000.

El Paso, Tex.—The El Paso and Fort Hancock Railroad Company has been organized; capital, \$100,000; will take over franchise granted to W. B. Latta and Richard Caples; line will be built from El Paso to Fort Hancock; line to Ysleta will be first built.—C. N. Bassett, President; Tom O'Keefe, Secretary.

Houston, Tex.—The Marshall and Sabine Valley Railroad, Mr. L. E. Walker as the head, has made application for a charter.

Quanah, Tex.—Sam Lazarus of Houston, Tex., is promoting a plan for a railroad from Quanah southwest for 40 miles; the Acme, Red River and Northwestern Railway may be interested.—M. Marx, Galveston, President.

Roby, Tex.—President W. A. Butts of the Estacado and Gulf Railway stated that the line will run from Roby to Coleman, Tex., 100 miles. Grading is finished from Roby to McCauley, Tex., on the Kansas City, Mexico and Orient Railway, 15 miles, and grading is going on east of McCauley.—T. H. Landon, Chief Engineer.

Spokane, Wash.—The Spokane, Columbia and Western Railway Company plans to build a line from Spokane to mouth of the Spokane River, via Davenport and Peach on the Columbia River, 70 miles in length; surveys have been made; right-of-way is partly obtained; work will be approximately 50 per cent. prairie and 50 per cent mountain work.—Clyde M. Graves, Terminal Bldg., Spokane, President; Alex M. Lupofer, Chief Engineer.

Spokane, Wash.—Arrangements have been made by the Northern Pacific to build a cut-off from Borax, Mont., to Spokane, Wash., by tunneling through Bitter Root Mountain; this will lessen the distance between Missoula and Spokane by eighty miles; all through traffic, both passenger and freight, will take the tunnel route; after emerging from the mountain the cut-off will strike the Coeur d'Alene River and follow the Blue Creek and Wolf lodge route to Coeur d'Alene and thence to Spokane; it may be two years before the work is completed.—W. L. Darling, Chief Engineer of the Northern Pacific Railway, St. Paul, Minn.

Green Bay, Wis.—The Bay Shore Street Railway Company has been incorporated to build an electric line and establish an amusement park. Fred A. Rahr, Frank E. Murphy, Treasurer of the Green Bay Traction Company, and others, are incorporators; capital, \$15,000.

Milwaukee, Wis.—The Milwaukee Light, Heat and Traction Company has been authorized to build a branch line from Waterford, Wis., the present terminus of the Milwaukee-Southwestern division, southwest to Lake Geneva.—John I. Beggs, Milwaukee, President, General Manager and Purchasing Agent.

Omro, Wis.—The Winnebago Traction Company (now owned by the Wisconsin Electric Company) plans to build an extension from Omro southwest to Berlin, 13 miles.—R. T. Dunn, General Manager, Fond du Lac, Wis.

BRIDGES

Arkadelphia, Ark.—Two bridges will be constructed over Cadda River at a cost of \$1,500.—Address County Auditor.

Batesville, Ark.—Five steel bridges will be erected in Independence County.

Visalia, Cal.—A bridge will be erected over Kings River.—County Supervisors.

Pensacola, Fla.—Plans and specifications of a new bridge to be constructed across Bayou Chico are now on file in the office of Clerk McMillan of the Board of County Commissioners; bridge to be a wooden one and to replace the one now spanning the bayou.—A. M. McMillan, Clerk of the Board of County Commissioners.

Mattoon, Ill.—Several bridges will be built in the new drainage district No. 1 of Mattoon and Lafayette townships.

Rock Island, Ill.—The Illinois State Engineer has been requested by the Bridge Commission of the Supervisors of the Rock Island and Henry counties to examine the site for two proposed Rock River bridges and to give estimates on the cost of the same; the two committees recently decided that Colona ferry and the township line between Hanna and Phenix townships in Henry County were the two best bridge sites and the State Engineer will proceed on this basis.

Pekin, Ill.—Mayor Schnellbacher has urged the appropriation of \$1,000 for repairing the slough bridge on the grade across the river.

Carlisle, Ky.—Nicholas County invites bids on franchise for construction and operation of steel toll bridge across Licking river at Parks Ferry.

Georgetown, Ky.—Council has ordered a five-foot bridge placed over the F. and C. R. R. bridge on North Hamilton.

West Point, Ky.—Nothing definite has yet been done toward constructing a bridge over Salt River at West Point; the matter is being considered by a committee. Cost reported to be \$35,000.—H. D. Lochner, Louisville, Clerk Fiscal Court.

New Bedford, Mass.—County bridge bonds amounting to \$100,000 are reported sold.

Baltimore, Md.—Chief Engineer Fendall has asked the Board of Estimate for \$60,000 for bridges over Slingluff avenue on Liberty road and over the Western Maryland tracks on Liberty road.

Baltimore, Md.—The Committee appointed by the Merchants' and Manufacturers' Association to consider the project of building a bridge across the Chesapeake Bay will report in favor of the plan and will recommend the expenditure of \$1,000 for a preliminary survey of the route; Westinghouse, Church, Kerr & Co., of New York, are the engineers recommended by the committee to make the survey.

Albion, Mich.—Bonds, \$30,000, have been sold for repairing Erie street bridge over Kalamazoo River; also reconstructing the Erie street, Haven and Superior street bridges.

Albion, Mich.—Bonds amounting to \$30,000 have been sold for repairing Erie street bridge over Kalamazoo river; also reconstructing the Erie street, Haven and Superior street bridges.

Detroit, Mich.—The Department of Parks and Boulevards has had plans prepared for a bridge over the marsh run on Belle Isle.—Philip Breitmeyer, Commissioner.

St. Joseph, Mich.—Woodin, McNear & Morris, of Chicago, have purchased \$30,000 St. Joseph bridge bonds at par.

Chisholm, Minn.—Bridges and culverts burned during the forest fires will be replaced soon.

St. Paul, Minn.—A report on new bridges and bridge improvements is being prepared by City Engineer Rundlett for presentation to the Conference Committee just before the making up of the city budget for the year 1909; City Engineer will recommend that money be provided for a bridge over the Omaha and Northern Pacific tracks at Earl street; for a new bridge to take the place of the old one over the Great Northern tracks at Lexington avenue and for planking parts of the Robert street bridge and the high bridge.

Kansas City, Mo.—J. L. Darnell, City Engineer, is preparing plans for a reinforced concrete bridge at Independence avenue and Blue River, for the Board of Public Works; estimated cost, \$25,000; bids will soon be asked.

Plans for a steel viaduct to be built by the Commercial Improvement Company between Twentieth and Twenty-third streets on Main street, were approved by H. L. Harmon, President, and John V. Hanna, Chief Engineer of the Kansas City Terminal Co.

Kansas City, Mo.—Plans for the Main street viaduct have been officially approved by the President of the Kansas City Belt Railway Company and the Board of Public Works; construction will begin as soon as possible; structure will consist of a reinforced-concrete approach and 15 steel plate girder arches; total length of the steel structure will be 760 feet, the spans varying from 38 feet to 78 feet 9 inches; viaduct will cross the east end of the platforms of the new Union Railway station, and the Station Company will build five additional spans, of a total length of about 260 feet, when the station is built; viaduct is being built by a private company of property owners with J. Logan Jones, President, and Kenneth Hartley, Engineer; it will be given to the city when completed.

Warrenton, Mo.—County Road and Bridge Commissioner David Mohler has called for bids for the construction of 26 new steel bridges to be placed in different

sections of the county; Post Oak Township gets two of these bridges; the span of one of the bridges is to be 16 feet, posts 14 feet, and floor 12 feet; the other bridge is to be placed near the farm of George Stone and the span is to be 20 feet, posts 10 feet, and floor 12 feet; a bridge is to be put in near the home of Mrs. Henry Douglass, with a 24-foot span, posts 9 feet, and floor 12 feet; this bridge is in Jefferson Township; all the structures are to be of steel.

Gulfport, Miss.—Harrison County has voted \$50,000 bonds for bridge and road improvements.

Bridgeton, N. J.—The Park Commission has decided to advertise for bids to build bridges according to the plans recommended by City Engineer Walter Sharp; there will be two bridges erected over the Raceway, one near the farm and the other at the juncture of the Race and Tumbling Dam Pond.

Batavia, O.—Bids will be received, November 7, for \$6,000 bridge bonds.—Chas. L. Ireton, County Auditor.

Dayton, O.—City Engineer Cellarius is considering with the Engineers of the D. L. and C. the advisability of an overhead crossing of the railroad at Washington street.

Guthrie, Okla.—City Council has authorized the Public Improvement Committee to confer with County Commissioners relative to building steel bridges across the Cottonwood River on Ninth street and Second street; final estimate for the abutments for the Ninth street bridge for the Topeka Bridge and Iron Company was approved in the sum of \$607.23.

Ralston, Okla.—The Commissioners of Pawnee and Osage Counties have reached an agreement whereby each county will give \$5,000 toward a big steel bridge over the Arkansas River here; citizens here donated \$3,000 cash and this will be added to the Commissioners' fund toward the bridge construction.

Portland, Ore.—Engineer Ralph Modjeski, of Chicago, Ill., has submitted to Council his report on the construction of a bridge over Willamette River or a tube under the river; he recommends the construction of a drawbridge, to be located just north of the steel bridge, at a cost of \$1,500,000; its west approach would be near the Union Depot and the east approach would rest at Broadway and Larrabee streets. He estimates that the cost of two tubes under the river, which would be necessary to care for all traffic, at \$2,800,000.

Pittsburg, Pa.—The Financial Committee of Council has passed an ordinance authorizing an issue of \$150,000 bonds for park improvements and the construction of water mains.

Somerset, Pa.—It has been decided to erect a reinforced-concrete bridge over Draketown Creek, near Draketown, Somerset County, and a steel bridge over the creek at Kimmel's Mills, this county; latter bridge will be 60 feet long, 14 feet wide and will have a concrete floor; bids will soon be asked.

Sioux Falls, S. D.—No bids were opened, October 15, by W. A. Cornell, County Auditor, for the bridge over Big Sioux River at Eighth street; the matter was referred back to the committee to report at some future date and also to consider the building of a concrete bridge.

Knoxville, Tenn.—The Viaduct Committee has decided that a "Y" shaped viaduct will be built on Asylum avenue.

Salt Lake City, Utah.—Council has received a petition asking for repairs of the "White bridge" across the Jordan at North Temple.

Bellows Falls, Vt.—A special meeting of the town of Rockingham will be held to see if the town will vote to build a new bridge across the canal at Bellows Falls, to take the place of the present iron bridge and provide means therefor.—Address Town Clerk.

Tacoma, Wash.—Commissioner McGregor has called attention to the necessity of repairing bridge No. 26, North Oakes street between Nineteenth and Twenty-first streets; the Committee of Streets and Alleys authorized the expenditure of \$734.35, the estimated cost of doing the work.

Tacoma, Wash.—County Surveyor George Thornton has been directed to prepare plans and specifications for a new pile trestle bridge, 16 feet wide, with a three-pile width support; the Secretary was also instructed to advertise for bids on the road between Tacoma and McMillin.

Winnipeg, Man., Can.—The Civic Bridge Committee is considering plans for a dual purpose bridge to be built over the Red River at the foot of Lombard street; plans are now on exhibition in the City Clerk's office.

MISCELLANEOUS

Anniston, Ala.—City Council has authorized the issue of \$11,000 bonds for public improvements.

Huntsville, Ala.—Mayor Smith has urged the purchase of the Calhoun property as a site for all city buildings and a park.

Long Beach, Cal.—City is contemplating the construction of a 30-foot walk along the beach as far west as the harbor with concrete retaining walls and concrete lamp posts; probable cost, \$100,000.

Oakland, Cal.—The Auditing and Finance Committee of Common Council has recommended that \$1,497 be appropriated for purchase of dirt for filling above the Eighth street bridge, to be used as a park site.

Tavares, Fla.—An election will be held December 5 in Lake County to decide the question of issuing \$200,000 4 per cent. road bonds.—Address County Clerk.

Calro, Ill.—The Board has passed resolutions releasing the Star Tankage and Fertilizer Company from responsibility on their sewage disposal contract with the city.

Chicago, Ill.—The estimate of the Internal Improvement Commission of the cost of the Illinois waterway link is as follows: For a 14-foot preliminary waterway, with locks 24 feet deep, for construction only, \$14,318,986; cost of developing 145,000 gross horsepower, four power houses and equipment complete, \$3,600,000; total construction cost of waterway and water power \$17,918,986; right-of-way, \$340,000; total cost of waterway and water power, 18,258,986.

Chicago (Lake View), Ill.—At the November election the proposition to issue \$250,000 Lake View Park improvement bonds will be submitted to a vote of the people.—Address Town Clerk.

Salem, Ill.—An election will be held to decide the question of issuing bonds for the erection of Court House in Marion County.

Davenport, Ia.—The McCarthy Improvement Company will make \$10,000 worth of improvements on City Island before establishing an asphalt plant; island will be raised six feet and two bridges built from the mainland.

Mason City, Ia.—The First National Bank of this city has purchased \$16,000 Cerro Gordo County bonds at \$16.164.

Alexandria, La.—The Board of Commissioners of Red River, Atchafalaya and Bayou Boeuf Levee District will open bids, November 4, for construction of two levees—Odenburg levee in Avoyelles parish, containing 20,000 cubic yards, and Scotland levee in St. Landry parish, containing about 30,000 cubic yards.—E. G. Richard, President of Board, and J. R. Thornton, Secretary.

Baltimore, Md.—The Park Board has purchased a lot in East Baltimore which will probably be added to Patterson Park.

Clinton, Mass.—The town will issue \$120,000 4 per cent. bonds for the erection of the municipal building.—Town Treasurer Charles E. Shaw.

Taunton, Mass.—The Board of Aldermen has amended the order for a \$30,000 appropriation for a police station so that Committee on Public Property shall act with the Joint Special Committee in the expenditure of the money.

Grand Rapids, Mich.—Right-of-way is being secured for the new dock line down the river.—City Engineer Anderson.

Kalamazoo, Mich.—The River Improvement Commission, City Engineer Johnson, Chairman, has asked \$25,000 to improve the channel for the prevention of floods.

Duluth, Minn.—Council is still discussing the purchase of a site for a police station.

Kansas City, Mo.—Mayor D. E. Cornell and members of the Kansas City Council are discussing a special election to vote on issue of \$250,000 bonds to build City Hall, equip a workhouse and build and equip three new fire stations.

Rolla, Mo.—An election will be held November 4 to decide the question of issuing \$700,000 park and school bonds.—City Comptroller.

St. Louis, Mo.—An election will be held November 3 to vote on the question of issuing \$700,000 park and school bonds.

Newark, N. J.—The Board of Health has appropriated \$2,500 to purchase an automobile ambulance for the City Hospital.

Brooklyn, N. Y.—Board of Aldermen has appropriated \$75,000 for the Street Cleaning Department to clean macadamized streets; \$27,159 for a playground in the vicinity of Siegel and McKibben streets; \$94,624 to build a bridge on Shore Road over First avenue; \$7,000 for Kings County jail, and \$2,000,250 for the new penitentiary on Rogers Island.

Binghamton, N. Y.—Council has received a petition that \$1,000 be allowed for cutting channels on the east and west banks of the Shenango River.

Geneva, N. Y.—The Board of Public Works will purchase additional land for the Lakeside Park.

Akron, O.—Council has appropriated \$15,000 for erecting and equipping a central police station.—Dow W. Harter, Clerk.

Dayton, O.—The Chamber of Commerce has urged the straightening of the Miami river channel and the improvement of the levee.

Oklahoma City, Okla.—Council is discussing erection of a municipal stable.

Randlett, Okla.—The Lawton, Wichita Falls and Northwestern Railway, will construct two steel bridges and about 300 feet of trestle work in connection with building of railroad from Red River Junction, Okla.—Charles Orth, Randlett, Chief Engineer.

Harrisburg, Pa.—The State Health Department has directed the boroughs of Sharpville, Sharon and South Sharon to prepare for establishment of sewage disposal and to stop draining it into the Shenango River, which supplies New Castle with water.

Philadelphia, Pa.—The budget of the Department of Docks for next year, calling for an appropriation of \$2,378,520, has been approved by Councils' Committee on Commerce and Navigation; it includes \$1,000,000 for the purchase of property and the construction of a double-deck freight pier at Vine street, which will come out of the \$13,500,000 loan; also for deepening and widening ship channel in the Schuylkill, \$100,000; for dredging private docks where city sewers enter Delaware and Schuylkill Rivers, \$50,000; for removal of bars and shoals inside of pier head line in front of docks, where latter are deeper than entrances, \$50,000, and for dredging city docks and repairing wharves, landings and reefer piers, \$35,000.

Philadelphia, Pa.—The Departments of Wharves, Docks and Ferries will expend \$750,000 for purchase of land and construction of a municipal pier at foot of Dock street, and \$1,000,000 for a pier at Vine street.—George R. Stearns, Director of Public Works.

Reading, Pa.—All bids opened, October 12, for the collection, removal and disposal of garbage, offal and dead animals for a period of three and five years have been rejected, and new bids will be called for.—Caleb Weidner, City Clerk; Elmer H. Beard, City Engineer.

Beaumont, Tex.—Taxpayers have voted \$50,000 bonds for construction of wharves.

Fort Worth, Tex.—C. J. Swasey has offered the city a park site at \$25,000 in lieu of the Jennings site under negotiation at \$50,000.

Hidalgo, Tex.—R. J. Swearingen, Attorney for the Drainage Commissioners, states that bids will be received by the County Judge about January 1 for \$500,000 drainage bonds.

Houston, Tex.—The citizens have voted \$700,000 bonds for municipal improvements.

BIDS RECEIVED

Anniston, Ala.—J. S. Conniff & Co., of Montgomery, have secured the contract for paving several thousand yards of additional sidewalks in Anniston at 87½ cents per square yard.

Birmingham, Ala.—C. M. Burkhalter has the contract, at \$23,035, for constructing sanitary sewers, and has also been awarded the contract, at \$1,513, for paving Florida avenue.

Florida, Ala.—The city has awarded the contract to J. B. McCrary & Co., Atlanta, Ga., to construct a sewer system.—G. F. Fetrey, Mayor.

Hope, Ark.—Bids were opened for the construction of a sewerage system and the lowest bid received was that of the Hamilton Bros. Construction Company, Taylorville, Ill., as follows:—6-inch pipe—14,500 linear feet 4 to 6 feet deep, 24 cents; 2,300 feet 6 to 8 feet deep, 26 cents; 400 feet 8 to 10 feet deep, 28 cents; 180 feet 10 to 12 feet deep, 40 cents; 8-inch pipe—33,400 feet 4 to 6 feet deep, 29 cents; 11,200 feet 6 to 8 feet deep, 31 cents; 4,000 feet 8 to 10 feet deep, 34 cents; 815 feet 10 to 12 feet deep, 40 cents; 10-inch pipe—4,900 feet 4 to 6 feet deep, 42 cents; 5,100 feet 6 to 8 feet deep, 47 cents; 2,500 feet 8 to 10 feet deep, 49 cents; 600 feet 10 to 12 feet deep, 62 cents; 330 feet 12 to 14 feet deep, 78 cents; 500 feet 14 to 16 feet deep, 93 cents; 500 feet 16 to 18 feet deep, \$1.07; 500 feet 18 to 20 feet deep, \$1.19; 200 feet 20 to 22 feet deep, \$1.40; 12-inch pipe—2,800 feet 4 to 6 feet deep, 53 cents; 400 feet 6 to 8 feet deep, 53 cents; 2,100 feet 8 to 10 feet deep, 55 cents; 2,700 feet 10 to 12 feet deep, 69 cents; 400 feet 12 to 14 feet deep, 85 cents; 550 feet 14 to 16 feet deep, \$1; 15-inch pipe—2,100 feet 4 to 6 feet deep, 66 cents; 1,200 feet 6 to 8 feet deep, 68 cents; 1,800 feet 8 to 10 feet deep, 70 cents; 600 feet 10 to 12 feet deep, 83 cents; 400 feet 12 to 14 feet deep, \$1; 1,000 feet 14 to 16 feet deep, \$1.17; 900 feet 16 to 18 feet deep, \$1.35, and 860 feet 18 to 20 feet deep, \$1.40; 40 flush tanks, each \$52; 135 manholes, each \$32; 60, each additional foot, \$5; 1 septic tank, \$3,765; 28,000 cubic yards filtering material, \$3; 600 cubic yards earth excavation, 40 cents; 1,600 feet 6-inch drain tile, 20 cents; Pumping Station—70 cubic yards excavation, 40 cents; 10,000 brick, \$2; 6 cubic yards concrete, \$12, and 1,680 feet 8-inch cast-iron pipe, 71 cents; total, \$62,111. Total of other bids received: Newmon Sewer Construction Company, Evansville, Ind.,

\$69,930; J. J. Dunegan, Shenandoah, Ia., \$69,782; G. Munz, Texarkana, Tex., \$66,454; Standard Construction Company, Chicago, Ill., \$86,999; Geisel Construction Co., St. Louis, Mo., \$72,911; W. T. Riley Construction Company, St. Louis, Mo., \$84,074; Pouncey Koumer & Construction Company, Helena, Ark., \$70,145; Monahan Bros., Joliet, Ill., \$77,575; Chas. F. Derr, Oklahoma City, Okla., \$73,756; H. C. Gass, Belleville, Ill., \$78,839; Bosler & Flynn, Chattanooga, Tenn., \$76,561; Bash & Gray, Joplin, Mo., \$65,249; Nick Peay, Little Rock, Ark., \$70,774; Irwin Bros., New Orleans, La., \$81,784; No. Alabama Construction Company, Riverton, Ala., \$81,532; T. M. Bermor & Co., Marion, Ind., \$83,584; W. W. Cook & Sons, Junction City, Kan., \$68,299.—J. A. Omberg, Jr., Goodwyn Institute Bldg., Memphis, Tenn., Engineer.

Berkeley, Cal.—Contract for improving wharf has been let by the Town Trustees to the Mervy-Elwell Company, Oakland, Cal., at \$21.25 per linear foot.

Los Angeles, Cal.—The Board of Public Works has awarded the contract for paving with asphalt a portion of South Main street to Fairchild, Gilmore & Wilton Company, Pacific Electric Building, at \$13,000.

San Francisco, Cal.—Contracts have been awarded by the Board of Public Works for the construction of five cisterns which are to be a part of the auxiliary fire protection system; C. Coghill was awarded the contract for a cistern at Plymouth avenue and Sadowa street and another at Berkshire and Diamond streets, at \$6,600. The contract for cisterns at Forty-seventh avenue and J street, Ninth avenue and J street, and Fifth avenue and I street were let to the Keystone Construction Company, 417 Montgomery street, San Francisco, at \$10,398. Thirteen bids were received for the work.—Marsden Manson, City Engineer.

The Board of Public Works has awarded contract for constructing sewers in Fulton and Devisadero streets to the City Street Improvement Company, for \$24,938.

The contract for the construction of two fireboats, which are to be a part of the auxiliary fire protection system, has been let to the Risdon Iron Works, the bid of the company being \$262,200; but two other bids were received—that of the Union Iron Works, for \$274,620, and the United Engineering Works, for \$275,990; the United offered in its bid to cut the price \$10,000 if it would be permitted to substitute Scotch boilers, which it offered to guarantee would not in any way make the boat less efficient.

Fort Barrancas, Fla.—S. S. Leonard has been awarded the contract, at \$2,500, for a high drain for the pump house.

Pensacola, Fla.—Mayor Goodman has purchased a covered patrol wagon from the Seagrave Company, of Columbus, Ohio, for \$800.

Augusta, Ga.—The Bridges and Wharf Committee of Council has recommended that the bid of J. H. McKenzie's Sons, of Augusta, be accepted at \$20,880 for piers for a draw span at Center street bridge.

Cairo, Ill.—The Board of Local Improvements received bids on sewers in uptown streets, three firms submitting bids, all within the estimates by the engineer, and with only about \$700 between the highest and lowest bids; the City Construction Company, of St. Louis, a new firm which made its advent in the Cairo field on these contracts was low bidder on all the streets and has been awarded contracts; Roy L. Williams was second and Garner, Hanes & Camery third.

The bids were as follows: City Construction Company, of St. Louis, Twenty-ninth street, \$3,251.68; Thirtieth street, \$3,549.70; Thirty-first street, \$3,551.37; Thirty-second street, \$3,379.36; Thirty-third street, \$4,951.83; Roy L. Williams, Twenty-ninth street, \$3,312.04; Thirtieth street, \$3,625.52; Thirty-first street, \$3,618.79; Thirty-second street, \$3,447.45; Thirty-third street, \$5,058.33. Garner-Hanes & Camery, Twenty-ninth street, \$3,392.04; Thirtieth street, \$3,715.52; Thirty-first street, \$3,698.79; Thirty-second street, \$3,469.60; Thirty-third street, \$5,119.58.—Mayor George Parsons, President of the Board; Ernest Nordman, Secretary.

Chicago, Ill.—The Parker-Washington Company, Chamber of Commerce Building, has secured the contract for pump pit, suction well and foundations for Roseland pumping station engine house for about \$46,000.

Chicago, Ill.—Bids were opened Oct. 15 by the Board Local Improvements (Chas. A. V. Standish, secretary) for constructing a concrete conduit, including bulkhead and inverted siphon, in Western avenue, from Sanitary Canal to West Thirty-ninth street, and for a brick sewer in Western avenue from West Thirty-ninth street to West Seventh-first street. Jos. Hanreddy, 79 Dearborn street, \$521,760; Federal Improvement Company, 953 Rookery Building, \$498,867; Marquette Construction Company, 171 Washington street, \$537,890; John W. Farley, 138 Washington street (awarded contract), \$427,609; Parker Washington Company, 138 Washington street, \$518,714; Nash Dowdle Company, 145 La Salle street,

\$534,322; Union Paving Company, 184 La Salle street, \$587,574; Michael P. Byrne, 5425 Halsted street, \$526,165; Nash Bros., 81 La Salle street, \$540,260; Thos. Burke, 1905 McLean avenue, \$531,640. The items of the successful bidder were: 650 feet, 14x12 feet concrete sewer, 30 feet deep, \$50; concrete inverted siphon (lump sum), \$12,000; 4,450 feet, 14x12 feet concrete sewer, 28 feet deep, \$28; 300 feet, 5 feet wing sewers, 20 feet deep, \$15. Three-ring brick sewers—205 feet, 9½ feet, 14.5 feet deep, \$26.38; 2,630 feet, 9½ feet, 16.5 feet deep, \$13; 2,660 feet, 9½ feet, 16 feet deep, \$12.80; 2,660 feet, 9 feet, 16.5 feet deep, \$12.50; 2,660 feet, 8½ feet, 17 feet deep, \$11.95; 2,660 feet, 8 feet, 18.5 feet deep, \$11.30; 2,660 feet, 7½ feet, 19 feet deep, \$10.80; 2,660 feet, 7 feet, 19 feet deep, \$10; 2,660 feet, 6½ feet, 19 feet deep, \$9; concrete bulkhead (lump sum), \$6,000.

Rockford, Ill.—The Standard Paving Company, of Chicago, has secured the contract for paving East State street at the following bid: 2,300 cubic yards concrete foundation, 40 cents; 410 square yards brick pavement, \$1.76; 6,550 square yards asphalt pavement, \$1.58; 600 cubic yards excavated pavement, 23 cents; total, \$12,529. Total of other bids: Barber Asphalt Paving Company, \$13,803, and Capital City Construction Co., \$12,773.

The following are the bids opened for paving West State and South Main street: (a) Barber Asphalt Paving Company, \$41,324; (b) Standard Paving Company, Chicago, \$37,410 (awarded contract), and (c) Capital City Concrete Construction Company, \$38,260; 10,000 cubic yards concrete foundation, (a) 45 cents, (b) 40 cents, (c) 47 cents; 1,235 square yards brick pavement, (a) \$1.98, (b) \$1.76, (c) \$1.40; 19,406 square yards asphalt pavement, (a) \$1.72, (b) \$1.58, (c) \$1.59; 2,500 cubic yards excavation, (a) 40 cents, (b) 23 cents, (c) 39 cents.—S. B. Hand, City Engineer.

Springfield, Ill.—Henry Nelch was awarded the contract for the construction of the South End sewer, his figures being \$3.35 per foot; the sewer is to cost \$20,000.

Urbana, Ill.—The Board of Local Improvements has let contract to J. W. Stipes, Champaign, at \$22,000, for constructing a brick pavement on West California street.—C. B. Holmes, City Clerk.

Evansville, Ind.—The Department of Public Works has let contract to the Anchor Roofing and Paving Company, city, for the construction of artificial stone sidewalks on both sides of Elliott street, from Washington to Chandler streets.—Walter F. Wunderlich, Clerk.

New Albany, Ind.—The Board of Public Works has awarded the contract for paving with brick a portion of Fifteenth street to W. O. Sweeney, of Jeffersonville, at \$4.54 per linear foot, from Main street to first alley south of Spring street, and \$4.74 per linear foot for the remainder of the street.

South Bend, Ind.—The Board of Public Works has approved bonds of Harry N. Barnes and contracts were signed for the Jefferson street and Portage avenue sidewalks and for the alley north of Grand Trunk Railway grading; bonds of Feaser & Robarge were filed and approved and the contract signed for Michigan street cement walks.

Cedar Rapids, Ia.—M. Ford, 118 South Second street, has the contract for 1,900 feet of 8-inch sanitary sewer.—E. P. Smith, City Engineer.

Waverly, Ia.—G. W. Clark, of Waverly, has secured the contract for erecting superstructure of a building for electric light plant and water works (bids opened Oct. 20) for \$10,400.

Davenport, Ia.—A. W. Freeman, of Moline, Ill., has been awarded the contract by the Finance and Bridge Committees of Council for the repairing of pier No. 5 on the Rock River bridge; his bid was as follows: Excavation, 20 per cent payrol, 1-inch rod for reinforcing, in place, 7 cents per pound; rails in place, \$30 per ton; concrete, \$5.70 per cubic yard.

Sioux City, Ia.—Sidewalk contracts were awarded as follows: C. J. Lever, Leeds, 13 cents a foot; L. Christiansen & Co., Morningside, 13½ cents a foot, and Iowa Cement Brick Company, Wright's Addition, 13 cents a foot.

Ellinwood, Kan.—The Mathews Electric Company, of Kansas City, Mo., has secured the contract for constructing municipal water works and electric light plant for \$33,700; other bids received were: F. A. Hurlbut, Kansas City, Mo., \$35,700; W. W. Cook & Sons, Pittsburg, Kan., \$37,998; J. A. Bortenlanger, Omaha, Neb., \$37,000; Squires Electric and Construction Company, Kansas City, Mo., \$35,500; Freeborn Engineering and Construction Company, Kansas City, Mo., \$37,391, and Joplin Electric Supply and Construction Company, Joplin, Mo., \$35,772.—W. K. Palmer & Co., Engineers, Kansas City, Mo.

Winfield, Kan.—The County Commissioners have awarded the contract for constructing a bridge over Silver Creek in Liberty Township, and one over Cedar

Creek in Cedar Township, to Walter Sharp.

Lexington, Ky.—Bids for the construction of concrete sidewalks, guttering and curbing on the following streets: Each side of Sixth street, Upper street to Limestone street; each side of North Upper street, from Sixth street to Seventh street; west side of North Limestone street, from Sixth street to Seventh street; south side of Seventh street, from Upper street to Limestone street. The bid of Hughes-Forman Company, 13 cents per square foot for sidewalks and 43 cents per linear foot for curbing and guttering being the lowest, it was recommended for acceptance.

Bids for the construction of concrete sidewalks, guttering and curbing on the following streets: In front of the property of Mat Benckart on Walton avenue; each side of Kentucky avenue, from High street to Euclid avenue; each side of Limestone street from Maxwell street to Lottie street was considered. The bid of Hughes-Forman Company for the work on Kentucky avenue at 12½ cents per square foot for sidewalks and 42½ cents for curbing and guttering, and the bid of the same company for the work in front of the Hugheson and Benckart property and the South Limestone street work at 12½ cents per square foot for sidewalks and 42 cents per linear foot for curbing and guttering being the lowest bid submitted, were recommended for acceptance.

Bids for the construction of concrete sidewalks, guttering and curbing on each side of Ashland avenue from Main street to High street were considered. The bid of Louis des Cognets & Company at 12 cents per square foot for sidewalks and 42 cents per linear foot for curbing and guttering being the lowest bid submitted, was recommended for acceptance; Hughes & Forman, the youngest firm of contractors in Lexington, bid 42 cents on curbing and guttering and 12½ cents on paving, being just one-quarter of a cent higher. Justice & Company bid 42½ cents and 13 cents, and Buford A. Graves & Company 50 cents for curbing and guttering and 13 cents for paving.

Lexington, Ky.—Bids on the construction of Ashland avenue from Main to High streets were received at the Mayor's office and opened in the presence of contending bidders. There were three bids on asphalt, one from the Barber Asphalt Company, from the Cincinnati office, at \$2.28 per square yard for genuine Trinidad Pitch Lake asphalt, with construction of the drain and sewer catchbasin included; one from the Andrews Asphalt Paving Company, of Hamilton, O., at \$21.193.32 for the entire street, and Carey & Reed, of Philadelphia, at \$2.15 per square yard. The bid of the Hamilton firm will have to be figured and it will also have to be determined by the Joint Improvement Committee whether all bidders have followed minutely the specifications. All bids were made on printed and iron-clad specifications. There were no bids on macadam. The Southern Bitulithic Company, of Nashville, Tenn., bid \$2.22 on bitulithic composition, or 40 cents on excavation, 30 cents on stone edging, 75 cents on 12-inch sewer-pipe and \$30 on catchbasins. Hughes & Forman bid \$2.19 per square yard on vitrified brick, or 69 cents per square yard for concrete base. The Headley Lumber Company, Lexington, bid \$2.46 to \$2.89 on creosoted wooden block according to grade of material used. The lowest and best bid will be determined by the committee and then sent to the Council. The latter will decide what material is to be used and if bids are satisfactory it will award the contract.

Louisville, Ky.—There were four bidders for the construction of Section E of the big outfall sewer, and the Ferro Concrete Construction Company, of Cincinnati, appeared to be the lowest; the section is from Twelfth and Wilson to Ninth and Hill, a distance of 3,373 feet, and the estimated cost is about \$111,000; the other bidders beside the Ferro Company were Henry Bickel, of Louisville; Weber & Company, of Chicago, and Hogle & Paul, of Dayton, O.

The Board of Public Works has awarded contracts to George W. Gosnell for three alleys at \$1.80 a square yard. The Board also awarded contracts to Stabler & McFarland for one alley at \$1.79 a square yard.

The Board has awarded contracts for twenty-three pieces of sidewalks to the lowest bidders, and Henry Bickel, the American Construction Company and George W. Gosnell were the successful bidders.

Baltimore, Md.—Bids were opened by the Board of Awards for sewer work, and contracts have been awarded as follows: Constructing sewage disposal works, sanitary contract No. 30, to New York Continental Jewell Filtration Company, New York, N. Y., \$506,998, to be completed in 500 working days; west low level interceptor, sanitary contract No. 31, to Metropolitan Construction Company, Baltimore, \$149,841, to be completed in 250 working days; force

main sewer, sanitary contract No. 32, Ryan & Reilly, of Philadelphia, Pa., for \$155,202, to be completed in 275 working days, and force main, sanitary contract No. 33, the Warren F. Brenizer Company, of Baltimore, \$120,778, to be completed in 211 working days.—Calvin W. Hendrick, Chief Engineer, Sewerage Committee.

Agawam, Mass.—The Water Commissioners have awarded the contract for furnishing 4,500 feet of 6-inch pipe for immediate delivery to R. D. Wood & Company, of Philadelphia, at the low price of \$23.10 per ton.

Boston, Mass.—With the approval of Mayor Hibbard, Superintendent of Streets, Guy C. Emerson has awarded the contract for paving Zeigler street, Roxbury, to the Rudolph S. Blome Company for \$2,359; the excuse given for making the contract without competitive bidding is that the company has a patent on a granitoid block that lasts longer than wooden blocks and is nearly as durable as cement.

The contract for a feed pump for the City Hospital has been awarded to Densmore & Le Clear for \$742.

Brookline, Mass.—On Oct. 19 the following proposals were opened for the construction of a surface water drain in Beacon street between Englewood avenue and Strathmore road: Timothy Driscoll, \$373.80; M. J. O'Hearn, \$324.20; T. J. Kelley, \$295; James Driscoll & Son, \$280.20. It was voted to award the contract to James Driscoll & Son, the lowest bidders.

Chelsea, Mass.—Chas. H. Belleden, 35-39 Wareham street, Boston, has been awarded contract for constructing new fire station in Everett avenue for \$31,395.

St. Joseph, Mich.—Jesswein Brothers, city, were awarded the contract, at \$13,220.50, for the construction of sewer No. 8 and outlet sewer for the southern portion of the city.—Harry J. Murphy, City Clerk.

Duluth, Minn.—The contract for the construction of a sanitary sewer from Elinor street to Highland street, in Division Six, West Duluth, as awarded by the Board of Public Works to Eklund & Nordquist, has been approved by the Council; the price was \$3,301. Council also approved awarding the contract for the construction of another sanitary sewer on Highland street from Fifty-seventh avenue west to Central avenue, to John Bregman, the price being \$452.

East Grand Forks, Minn.—Bids were received for the construction of the water works, Loweth & Wolff, engineers, St. Paul, as follows: Morvia Construction Company, New York, \$41,862; J. G. Robertson, St. Paul, \$31,268; Pastoret & Lunz, Duluth, \$32,231; W. D. Lovell, Minneapolis, \$31,690; James Kennedy, Fargo, N. D., \$30,180; P. McDonnell, Duluth (awarded), \$27,209.

New Prague, Minn.—Adolph Krapf has secured the contract to construct an addition to the municipal electric light plant. It is proposed to install a storage battery.

Shakopee, Minn.—W. C. Fraser, of Rochester, has secured the contract for constructing water works for \$5,000.

Jackson, Miss.—O'Herron & Company, Pittsburg, Pa., were awarded the contract, at \$36,500, for the construction of a sewer system at Jackson.—Hamilton Johnson, City Engineer.

Alba, Mo.—The contract for installing the water system here has been let to Dan Hamilton, of Joplin, Mo.—W. F. Barnett, City Clerk.

St. Louis, Mo.—The Granite Bituminous Paving Company has received contracts for paving as follows: Penrose, Lawrence streets, Red Bud and Ridge avenues, Shawmut and Temple place, for \$127,518.

New Haven, Mo.—Contracts have been awarded for the construction of a portion of the water works as follows: To United States Pipe Company, of St. Louis, for pipe, \$3,300; to Rensselaer Manufacturing Company, of Troy, N. Y., for hydrants and valves, and to O. G. Wilson, of St. Louis, for one 400-foot deep well of 8 inches diameter.—W. A. Fuller, Chemical Building, St. Louis, Engineer.

St. Joseph, Mo.—The Board of Public Works has awarded the contract for paving a portion of 12th street with Hassam pavement to Rackliffe & Gibson at \$1.75 per square yard.

Springfield, Mo.—The contract for paving with brick a portion of Benton avenue has been awarded to Jarrett Construction Company, of Springfield, at \$2.31 per square yard.

Missoula, Mont.—The Oliver Bridge Company, Spokane, Wash., which was awarded the contract in September for the construction of the Higgins avenue bridge, has obtained permission to withdraw its bid on the ground that the letting of the contract had not been strictly in compliance with the law, which calls for competitive bidding.

Beatrice, Neb.—The Board of Supervisors of Gage County has awarded the contract to the Standard Bridge Company, of Omaha, Neb., at \$3,318, for the construction of one 130-foot steel bridge, with 20-foot approach,

across the Big Blue River in Rockford Township.—B. H. Conlee, County Clerk.

Lincoln, Neb.—The Dimmick Pipe Company has been awarded contract for furnishing 50 tons 4-inch and 150 tons 6-inch cast-iron pipe, Class C, also 175 tons 20-inch cast-iron pipe, Class D; the bids received follow: Lynchburg Foundry Company, Chicago, Ill., 4-inch pipe, \$27; 6-inch pipe, \$26.15; 20-inch pipe, \$26.15; R. D. Wood & Company, Philadelphia, Pa., 4-inch pipe, \$30.70; 6-inch pipe, \$29.20; 20-inch pipe, \$29.20; The Dimmick Pipe Company, Birmingham, Ala., 4-inch pipe, \$25.75; 6-inch pipe, \$24.75; 20-inch pipe, \$23.45; United States Cast Iron Company, Chicago, 4-inch pipe, \$27.35; 6-inch pipe, \$26.35; 20-inch pipe, \$24.35.

The laying of pipe is done by day labor; average \$2 per day.

The National Meter Company has contract for furnishing meters, for which the city pays \$12.40, and sells them at the same price.—Thomas H. Pratt, City Clerk.

Harworth, N. J.—Council has awarded the contract for macadamizing the Valley Road, and Harworth Drive to Edward English, of Ridgefield, for \$14,800.

Masonville, N. J.—Patrick J. Byrne, of Burlington, has been awarded the contract for constructing a county bridge between Hartford and Masonville, at about \$4,000, this bid being about \$700 lower than the next highest.

Brooklyn, N. Y.—Bids were opened at the office of John H. O'Brien, commissioner of Water Supply, Gas and Electricity, New York City, for extending and improving the high-pressure fire service system at Coney Island, and the lowest bid received was that of Murphy Brothers, of Brooklyn, at a total of \$68,379.

The following are the bids opened by John H. O'Brien, Commissioner Water Supply, Gas and Electricity, for furnishing, delivering and installing a draining apparatus on fire hydrants in Brooklyn Borough: W. G. Clarke, 438 West Fortieth street, New York City, \$31,500; Jno. Grant, 442 Rogers avenue, Brooklyn, \$38,800; John Mead, 215 Montague street, Brooklyn, \$38,700, and W. C. Hopkins, \$38,640.

The Standard Asphalt and Rubber Company was low bidder for nine pieces of paving work in the borough; the bids were opened in the Borough Hall by Deputy Public Works Commissioner William E. Melody, and the figures put in by the Standard Company call for the laying of asphalt at \$1.27 a square yard, and for the putting in the concrete foundation at \$5.15 a cubic yard. The work to be done is the paving with asphalt, Class B, on a concrete foundation, of the following streets: Caton avenue, from Marlborough road to Parade place; Dltmas avenue, from Flatbush avenue to Ocean avenue; Eighty-fourth street, from Eighteenth avenue to Twenty-first avenue; Hinsdale street, from Sutter avenue to Riverdale avenue; Nichols avenue, from Jamaica avenue to Atlantic avenue; Prospect place, from Rochester avenue to Buffalo avenue; Rochester avenue, from St. Mark's avenue to Eastern Parkway; Sixty-fourth street, from Third to Fourth avenues; Sutter avenue, from Rockaway to Saratoga avenues.

New York, N. Y.—The following bids were received by Theodore Bingham, Police Commissioner, for the materials necessary to install the lighting and electric fixtures in the new building to be erected on the block bounded by Grand, Center and Broome streets and Center Market place, Borough of Manhattan, for headquarters for the Police Department of the City of New York: Lord Electric Company, 213 West Fortieth street, \$16,896; Sterling Bronze Company, 107 West Twenty-fifth street, \$17,500.

The Hastings Pavement Company, 25 Broad street, was low bidder at \$51,355 for paving with asphalt tiles walks in Central and other parks, for the Department of Parks, Fifth avenue and Sixty-fourth street.

Riverhead, L. I., N. Y.—Muralt & Company, of New York, have secured the contract for the enlargement and improvement of the hydro-electric plant of the Riverhead Electric Company, of Riverhead, L. I. The old water wheels now in use will be taken out and new Trump turbines of the vertical shaft type will be installed. The electric equipment will be of the three-phase alternating current type with a frequency of 60 cycles per second and 1,100 volts; there is also an auxiliary steam plant for emergency purposes.

Rochester, N. Y.—The Board of Contract and Supply awarded contract to F. C. Lauer & Sons Company, 458 Clinton avenue, S., for the construction of a sewer and trap-rock pavement in Rugby street, at \$16,973.

Saranac Lake, N. Y.—John B. Doener, Ballston Spa, has been awarded the contract for the construction of about two miles of sewers at Saranac Lake.—S. A. Miller, Village Clerk.

Syracuse, N. Y.—Contracts were awarded by the Board of Contract and Supply for

the construction of the second Skaneateles Lake water conduit a distance of 20 miles as follows: First section, to Lane & Hennessy, of Syracuse, at \$105,945; second, third and fourth sections to Clinton Beckwith, of Herkimer, at \$150,295.

The following are the unit prices of the successful bidders:

Sec. 1—Lane & Hennessy Company, 120 square rods chopping and clearing, \$1.50; 80 square rods grubbing and clearing, \$2; 1 section testing pipes under pressure, \$1,000; 72,000 cubic yards trench excavation, 90 cents; 500 cubic yards ordinary excavation, 50 cents; 900 cubic yards embankment, 60 cents; 20 cubic yards gravel lining, 75 cents; 10 cubic yards slope wall, \$3; 30 cubic yards box culvert masonry in cement, \$8; 20 cubic yards retaining walls in cement, \$8; 20 cubic yards retaining walls dry, \$6; 80 cubic yards rubble masonry in cement, \$8; 5 cubic yards cut stone coping in cement, \$35; 5 cubic yards dimension cut stone, \$35; 30 cubic yards brick masonry in cement, \$20; 15 cubic yards concrete masonry, first class, \$13; 50 cubic yards concrete masonry, second class, \$10; 25 square yards stone paving, \$2; laying, 7,550 linear feet 42-inch pipe and specials, \$1.50; 13,600 linear feet 30-inch, \$1.25, and 100 linear feet 10, 8 and 6-inch, 50 cents; furnishing and laying 110 linear feet 4-inch tile drain, 10 cents; 6,000 feet timber and plank in work, \$50; 5,000 feet hemlock timber and plank in work, \$35; 4 w.-l. doors for gate houses and vaults, \$25 and \$22 each; 20 w.-l. trap doors for houses, each, \$18; 100 pounds wrought iron, 6 cents; 100 pounds cast iron, 4 cents; 4,200 pounds steel I-beams, shapes, spikes and nails, 5 cents; 50 pounds stone monuments, \$2; 1,000 square feet tin roofing, 14 cents; 100 square yards repointing old masonry, 50 cents; 200 square yards painting, 20 cents; total, \$105,945. Totals of other bids on this section: Monarch Contracting Company, Syracuse, \$143,724, and C. H. Fath Constructing Company, Cleveland, O., \$137,478.

Sections 2, 3 and 4, Clinton Beckwith: 1,150 square rods chopping and clearing, \$1; 370 square rods grubbing and clearing, \$1.50; testing 3 section pipes under pressure, \$1,500; 141,000 cubic yards trench excavation, 60 cents; 3,100 cubic yards ordinary excavation, 50 cents; 6,900 cubic yards embankment, 30 cents; 50 cubic yards gravel lining, \$1; 60 cubic yards slope wall, \$4; 150 cubic yards box culvert masonry, in cement, \$6; 220 cubic yards retaining walls in cement, \$6; 270 cubic yards retaining walls, dry, \$4; 250 cubic yards rubble masonry, in cement, \$6; 15 cubic yards cut stone coping in cement, \$25; 15 cubic yards dimension cut stone, \$25; 100 cubic yards brick masonry in cement, \$12.50; 55 cubic yards concrete masonry, first class, \$7.50; 370 cubic yards concrete masonry, second class, \$6; 430 square yards stone paving, \$1.50; laying 74,850 linear feet 30-inch pipe and specials, 55 cents, and 200 linear feet 10, 8 and 6-inch, 50 cents; 150 linear feet 4-inch tile drain, 25 cents; 15,000 feet white pine timber and plank in work, \$45; 6,000 feet hardwood timber and plank, \$50; 3,000 feet hemlock timber and plank, \$30; 14 w.-l. doors for gate houses and vaults, each, \$50; 66 w.-l. trap doors for gate houses, each, \$10; 300 pounds wrought iron, 5 cents; 300 pounds cast iron, 5 cents; 14,500 pounds steel I-beams, shapes, spikes and nails, 5 cents; 150 stone monuments, each, \$1; 3,900 square feet tin roofing, 12 cents; 150 square yards repointing old masonry, \$1; 700 square yards painting, 25 cents; total, \$150,295.

Bridgeport, O.—The County Commissioners have awarded the contract for constructing a bridge over Wheeling Creek here to the Capital Construction Company, of Columbus, at \$9,864.

Cincinnati, O.—W. Taulman has the contract for improving Dawson road, at his bid of \$4,700.

Dayton, O.—The lowest bid opened by the Board of Public Service for installing air compressor in the water works pumping station was submitted by the Pennell & Muid Construction Company, of Cincinnati, O.—William Budroe, Clerk.

The contract for constructing storm water sewer in N. Bend avenue and the Webster street sanitary by-pass sewer is reported to have been awarded to Shafer & Dill for \$9,184.

The Platt Iron Works, of Dayton, have secured the contract for air compressor and appurtenances for pumping station for \$2,469.

Jefferson, O.—The Ashtabula County Board of Commissioners have awarded contract to William Batchelor, of Conneaut, O., at \$4,787.49, for the construction of a sewer from the county buildings and a sewage disposal plant.

Steubenville, O.—The County Commissioners opened bids as follows for paving S. Wells street: (a) with sandstone curb, slag ballast and block paving; (b) concrete curb, gravel ballast and brick paving; Rosser & Maloney, (a) \$19,038, (b) \$17,742;

Floto Brothers, (a) \$21,879, (b) \$18,156; J. O. Bates, (a) \$25,430, (b) \$24,505; T. J. Stringer, (a) \$20,041, (b) \$20,186; Dixon & Pickett, (a) with McClain brick \$17,428, (b) \$16,579, or \$16,469 and \$16,360 for Toronto or suburban brick; Vanmeter & Co., (a) \$19,322 and (b) \$17,010 (awarded contract).

Taylorsville, O.—Bids for the construction of that part of the Taylorsville bridge which was destroyed by the wind storm of last summer were opened at the office of the County Commissioners on October 19; there were eight bids, which call for steel work, as follows: Oregon Bridge Company, \$12,860; Nelson, Meredith & Co., \$13,375; Capitol Construction Company, \$12,423; Riverside Bridge Company, \$14,125; Pennsylvania Bridge Company, \$13,390; E. L. Landor, \$13,500; Delaware Bridge Company, \$12,777; Brookville Bridge Company, \$11,145; Mount Vernon Bridge Company, \$11,839.

Tiffin, O.—The Board of Public Service has let contract to John E. King, city, for 4,175 square yards of brick paving on N. Sandusky street, at \$7,497.—Jno. E. Diemer, Clerk.

Youngstown, O.—The following are the low bids opened for paving High street: Michael Horan, \$17,622; Kennedy Brothers, \$17,759, and Mullin & Caldwell, \$17,862.

Zanesville, O.—The contract for constructing steel bridge at Philo (bids opened October 19) has been awarded to the Mt. Vernon Bridge Company, Wyandotte Bldg., Columbus, for \$11,839.

Muskogee, Okla.—Bouse & Bouse have secured the contract for the installation of a sewerage system in the Ornedale addition for \$10,377.

Oklahoma City, Okla.—Geo. H. Keifer, city, secured the contract for constructing four filter basins for \$19,714.

City awarded contract to Bouse & Bouse, of Oklahoma City, at \$10,377.50, for construction of sewer system in Ornedale Addition.

Celilo, Ore.—Coughran, Winters, Smith & Co. have been awarded the contract for constructing three miles of the Government canal.

St. Johns, Ore.—Contract for building new Philadelphia street city dock has been awarded by Council to Joseph Paquett, at \$32,299.

Ambridge, Pa.—A contract for paving First street with brick and stone curb was let to F. Briola & Bro. at a special meeting of Council.

Montgomery, Pa.—James H. Nuss and Simon B. Hoffman have been awarded the contract to construct a sewer in Broad street, Montgomery; about 3,000 feet of 8, 10 and 12-inch pipe will be required.

Philadelphia, Pa.—George R. Stearns, Director of Public Works, has awarded to the Millard Construction Company, Pennsylvania Building, Philadelphia, a contract for the construction of a reinforced-concrete arch bridge on the line of Fox street, over the Richmond branch of the Philadelphia and Reading Railway, at \$27,000.

Somerset, Pa.—The County Commissioners have awarded the contract for the new reinforced-concrete bridge over Brush Creek in Northampton Township to the Nelson-Merydith Company, Lewis Block.

Wilkes-Barre, Pa.—The County Commissioners received bids for repairing a number of bridges and constructing several new bridges; H. J. Harrison was awarded the contract for building bridges No. 12 and No. 13 in Huntington Township, his bid for both jobs being \$548; Thomas W. Hayes will repair the bridges across Hescopock Creek at Snyder's Mills, and near the house of Lloyd Karchner, for \$2,014; Andrew Croop will make the repairs to the shingle mill bridge across Hunlock's Creek, his bid of \$400 being the lowest submitted.

Providence, R. I.—Fred E. Shaw has the contract for the construction of a 15-inch pipe sewer from the City Hospital land to Douglass avenue, a distance of 380 feet.

Newberry, S. C.—The contract for the new steel bridge at Chappells has been let to the Southern Bridge Company, of Birmingham, Ala., for \$2,375; this includes only the steel span and two steel piers; the span is 150 feet long; six bids were submitted as follows: Southern Bridge Company, Birmingham, Ala., \$2,375; Joliet Bridge and Iron Company, Joliet, Ill., \$2,547; Austin Bros., Atlanta, Ga., \$2,700; the Southern Highway Bridge Company, Greenwood, S. C., \$2,686; Illinois Bridge Company, Chicago, Ill., \$4,470; A. D. McClain, Spartanburg, S. C., \$3,495; the bridge is built jointly by Saluda and Greenwood counties and the two counties furnish all the necessary lumber.

Spartanburg, S. C.—The County Commissioners have awarded the contract for the erection of a steel bridge, known as Hill's bridge, across the Tyger River to A. D. McClain, of Spartanburg, at \$9,950; other bidders were: York Bridge Company, of York, Pa., \$10,600; Gates Machine Company, of Burlington, N. C., \$10,490; Canton Bridge Company, of Charlotte, N. C., \$10,487; Joliet Bridge and Iron Company, of Columbia, S. C., \$10,367.

Sioux City, S. D.—Neal Campbell, Joe Sampson, John Melroy and Thomas Hardison were awarded contract for improving sundry streets.—W. A. Cornell, City Auditor.

Chattanooga, Tenn.—The Board of Public Works has let the contract for the repairing and remodeling of No. 3 fire hall, which was condemned by the Building Inspector over six months ago, to Johnson & Stewart, for \$4,200, which includes besides a concrete floor, many improvements which will add to the safety and comfort of the firemen.

A contract for two heavy outside lighting fixtures to be placed in the corridors of the new City Hall was awarded to the Terrell-Hedges Company for \$630.75; these fixtures will be 5 feet 9 inches high and made of cast bronze.

Chamberlain & Freeman were given the contract for the cement sidewalk around the Park Place schoolhouse.

Acting on the report of City Engineer Hooke, the contract for the paving of the two McCaille avenue districts, Nos. 37 and 56, was awarded to the Southern Paving and Construction Company; district No. 56 includes that part of McCaille avenue lying between Douglas and the Southern railway bridge, to be paved with asphalt; the price was \$14,036.49; district No. 37 includes that part of McCaille avenue lying between the viaduct and Cemetery avenue, to be paved with brick; the price was \$2,425.42.

Johnson City, Tenn.—Bosler & Flynn, Chattanooga, have been awarded the contract by the city at about \$20,000 for sewer construction.

Brownwood, Tex.—At a meeting of Council for the purpose of purchasing an engine for the new pump station of the city water works, a contract was let for the gas-producing engine; the saving in fuel is claimed to be very great as compared with the steam plants; the Foss Gas Engine Company, of Springfield, O., received the contract; the plant complete will cost about \$12,000.

Fort Worth, Tex.—Graham & Priddy, Fort Worth, are low bidders at \$4.50 per foot for drilling test artesian well, 12 inches in diameter, 1,000 feet or more in depth, and cased with wrought iron; also with agreement to work over old well at \$3 per foot.—John B. Hawley, City Engineer.

Galveston, Tex.—Kelso & Vautrin were low bidders, at \$18,406.38, for extending the Nineteenth street drain.—A. T. Dickey, City Engineer.

Houston, Tex.—The opening of bids by Council recently for the 15,000,000-gallon pump which is to be installed at the city water works developed that the lowest bid of the 16 placed before Council was nearly \$10,000 higher than the lowest bid submitted when the first set of bids were opened in August. The highest was about \$1,000 more than the highest at the first opening. Five different companies had in bids. In order to better classify them, the bidders submitted proposals numbered, respectively, (a), (b), (c), etc. The different sets are as follows: Nordberg Manufacturing Company, (a) \$47,515, (b) \$54,915; Bethlehem Steel Company, (a) \$33,839, (b) \$73,585, (c) \$71,306, (d) \$40,550, (e) \$89,439, (f) \$87,555, (g) \$75,906; Allis-Chalmers Company, (a) \$96,300, (b) \$89,100, (c) \$84,415, (d) \$55,730; Wisconsin Engine Company, \$94,900; A. M. Lockett Company, (a) \$76,595, (b) \$38,744. As may be noted, there is a considerable difference in the prices; the highest this time is \$96,300 as against \$95,230 when bids were first opened; the lowest is \$38,744 as against the lowest of \$28,583 last time; The City engineer was instructed to draw up a list of the bids, classifying them and giving such information as may aid Council in making a selection.

Commissioners of Court of Harris County met recently with Judge Amerman, Commissioners Hirsch and Hare being present, to open bids for the paving of sections of the following county roads: A part of the Bedlin road, a section of the Cedar bayou and Crosby road and one-half mile on the Lynchburg and Crosby road. The bids were referred to the County Engineer for totals and repairs. The following are firms and figures of the competitors bidding on the various roads: Haden & Smith's bid for paving Redlin county road is as follows: Ditching, 17 cents; embanking, 14 cents; R. F. M. shell, 60 cents; lumber, \$50; concrete, \$12; sewer pipe, \$2.50; excavation, 45 cents. Texas Grading Company bid: Ditching, 17½ cents; embanking, 17½ cents; R. F. M. shell, 60 cents; lumber, \$65; concrete, \$15; crushed rock, 75 cents; rolling, 22 cents; sewer pipe, \$2.75; excavation, 50 cents; water, 20 cents.

Cedar Bayou and Crosby Road—Haden & Smith's bid: Excavation, 14 cents; ditching, 16 cents; drainage ditch, 17 cents; embanking, 17 cents; red fish mud shell, 84 cents; creosoted lumber, \$50; concrete, \$12; sewer pipe, \$2.50; excavation for culverts, 40 cents. Texas Grading Company's bid: Excavation, 17½ cents; ditching, 17½ cents; embanking, 17½ cents; red fish mud shell,

76 cents; rolling, 22 cents; creosoted lumber, \$71.50; concrete, \$13.75; sewer pipe, \$2.75; excavation, 50 cents.

One-half mile Lynchburg and Crosby Road—Texas Grading Company's bid: Ditching, 17½ cents; crushed rock, 89½ cents; rolling, 22 cents; water, 20 cents; lumber, \$45; concrete, \$15; excavation for culverts, \$50 cents. Haden & Smith's bid: Ditching, 17 cents; red fish mud shell, 73 cents; lumber, \$50; concrete, \$12; excavation, 45 cents.

Teague, Tex.—Contract has been let for a complete water works system for Teague at the contract price of \$36,550, and it is to be completed within ninety working days; the water is to be piped through a wood composition pipe from Groover Springs, three miles north of town; these springs have a daily capacity of about 400,000 gallons of first-class water.

Berryville, Va.—The Town Council has awarded the contract for completing the reservoir to Miller & Glaize, of Winchester, at a contract price of \$3,060.

Lynchburg, Va.—The following are the bids opened for repairs to the Rivermont viaduct: (a) total cost; (b) price to be deducted for 9-inch I-beams: W. W. Lindsay & Co., (a) \$10,200, (b) \$450; Laner & Harper, (a) \$8,890, (b) \$300; Virginia Bridge and Iron Company, Roanoke, (a) \$9,960, (b) \$1,000; Dietrich Bros., (a) \$10,160, (b) \$270; Jones & Adams, (a) \$10,790, (b) \$450; Carolina Engineering Company, (a) \$8,500, (b) \$150; Owego Bridge Company, Owego, N. Y., (a) \$8,732, (b) \$520; Nelson-Meredith Company, Atlantic City, N. J., (a) \$9,08, (b) \$390; Joliet Bridge Company, Joliet, Ill., (a) \$4,437, (b) \$700.—H. L. Shaner, City Engineer.

Tacoma, Wash.—Seventeen local street contractors entered bids with commissioner of Public Works H. J. McGregor for two grading jobs which aggregated only about \$10,000; there were nine bidders for the grading of East C street between Twenty-ninth and Thirty-second streets, the City Engineer's estimate being \$4,847; the contract was awarded to the Puget Sound Cement and Stone Block Company upon its bid of \$3,034; this work is included in what will be known as district No. 653. The other grading job was on South I street from Fifty-second to Fifty-sixth streets, in district No. 394; the Engineer's estimate was \$4,478, and the work went to R. C. Bennett upon his bid of \$3,890, he being the lowest of eight bidders.

Tacoma, Wash.—The Board of County Commissioners have awarded A. W. Dennis the contract for graveling Park avenue between South Thirty-leighth street and South Sixty-fourth; the specifications state that the County supplies the gravel and the steam rollers for the work and all that the contractor is required to do is to haul, screen and level the gravel; the road space to be covered is 8,747 feet, which will require 2,500 cubic yards of gravel; Dennis' bid, the lowest received, was \$118.75.

Charleston, W. Va.—The city has awarded contract to James Ferry & Sons, Grafton, Pa., at \$62,172.80, for construction of sewer system; sewers to be of brick.—W. A. Hogue, City Engineer.

Pennsboro, W. Va.—The city will expend about \$12,000 in improvements to water works; William B. Osborn, Clarksburg, W. Va., has been awarded the contract to erect a pump station and install pumping equipment, consisting of air-lift system combined with triplex power pump, both driven by gas engine.

The U. S. Construction Company, Columbus, O., has the contract for construction of pipe-distributing system and water-storage tanks, including 100-barrel reservoir and 1,250-barrel tank.

Green Bay, Wis.—Chris Vandersande was awarded the contract to build the cement sidewalk around the Federal building, on Adams and Walnut streets; the grade line on Adams street has been made such that the sidewalk can be laid and still allow the trees standing; a 10-foot sidewalk will be laid on Adams street while on Walnut but six feet will be laid; this will leave a space of six feet on Walnut street and from eight to ten feet on Adams street for a terrace.

Mauston, Wis.—J. Rasmussen Sons Company, Oshkosh, were awarded the contract for paving, curbing and guttering a portion of State street.—K. L. Sharp, City Clerk.

Oconomowoc, Wis.—C. J. Crilley, of Milwaukee, has secured the contract for sewers (bids opened October 24) at the following bid: 4,600 feet 24-inch pipe, \$1.83; 773 feet 15-inch pipe, \$1.23; 2,083 feet 12-inch pipe, \$1.13; 750 feet 8-inch pipe, 87 cents; 23 manholes, \$30, and disposal plant, \$9,334; total cost, \$22,399. Totals of other bids: F. E. Kaminski, Berlin, \$24,140; N. Reichert, Racine, \$29,654; Advance Construction Company, Waukesha, \$25,954; E. R. Harding, Racine, \$22,914; R. Nelson, Racine, \$25,141; G. R. Keachle, Madison, \$26,293, and H. O. Shafer, Green Bay, \$30,970.

TRADE NOTES

Cast Iron Pipe.—Chicago. Prices are unchanged. Quotations: 4-inch, \$27; 6 to 12-inch, \$26; 16-inch and up, \$25. Birmingham. An absence of orders for large sizes of pipe is noted. Quotations: 4 to 6-inch, \$24; 8 to 12-inch, \$23; over 12-inch, average, \$21.

Lead.—Prices have advanced. Quotations: New York, 4.35c. to 4.45c.; St. Louis, 4.20c. to 4.25c.

Oil Burner.—Several prominent capitalists of Cleveland, O., are about to incorporate a concern known as the Smokeless Heat and Power Company of America with a capital of \$500,000. The process to be used has been tried out in a plant at Lima and consists of the conversion of crude or fuel oil into heat and power by a special device. It is claimed that great heat can be produced without smoke. The burners and retorts will be manufactured at the company's plant in Lima. Among the owners of the invention are J. W. Keenan and F. R. Hall, of Cleveland.

Gas and Gasoline Engines.—Jacobson Machine Manufacturing Company, Warren, Pa., in Bulletin K, describes the Jacobson gas and gasoline engines for electric lighting service, showing various types of electric light plants, including portable and semi-portable types. For this class of work, covering the electric lighting field up to 600 lamps capacity, the engines are built in three types, the throttling, in sizes from 2½ to 25 hp.; the automatic, in sizes from 8 to 30 hp., and the tandem, in sizes above 40 hp.

Chemical Fire Apparatus.—The Tea Tray Company, of Newark, N. J., several months ago set aside one section of the plant on Murray Street, which, by the way, covers nearly three acres of ground, for the manufacture of fire department apparatus, particularly combination chemical-hose wagons. This was in March, and the first contract was in the nature of an experiment, but the ability of the Tea Tray Company to construct a modern chemical hose cart according to the most approved designs, was easily demonstrated. Experience of years in manufacturing extinguishers of all sizes had taught the Newark concern much concerning the production of a full fire-fighting equipment. Thus the first chemical wagon was built. It went to a Western city and has proved satisfactory. Since then ten contracts for chemical wagons have been placed with the Newark factory. One wagon has been built for East Orange, another for Newark, and one is being built for Bayonne.

Rock Asphalt.—The Ardmore Rock and Asphalt Company, Ardmore, Okla., recently gave a statement of the history of their business before the City Council of Guthrie, Okla. It was stated that the Ardmore asphalt had been in use in Kansas City, Mo., for twelve years, and miles of it are now being laid in Kansas City, Kan. It was stated that the cost in Kansas City was \$2.18 a square yard, and that on account of freight rates in shipping the bulky material to Kansas City it could be laid in Guthrie cheaper. The City Council was invited to send a committee to Ardmore to examine the plant and the paving at Ardmore. The statement was made that no arrangements were being made to ship some of the Oklahoma asphalt to Europe for use.

Fire Apparatus.—M. V. Keller has opened warerooms at Harrisburg, Pa., and will carry a full line of approved fire protection appliances, Fire Department apparatus and supplies.

PATENT CLAIMS

901,154. Street-Sweeper. Lester A. Crozier, Lynn, Mass. Serial No. 399,001.

In a street-sweeping machine, the combination, with a brush and means for rotating the same, of a pair of tiltable pans disposed upon opposite sides of the brush, means for bodily raising or lowering the pans simultaneously, and means carried by each pan for limiting its tilting movement.

901,228. Turbo-Pump. Guy B. Collier, Kinderhook, N. Y. Serial No. 354,363.

A turbo-pump provided at its inlet end with radially extending rotor and stator blades arranged in successive series axially, the rotor blades being so arranged that the axial clear cross sectional area between the blades in each stage varies and the outlet angles decrease in successive stages to progressively increase the velocity and pressure of the entering fluid in the successive stages, substantially as described.

901,340. Concrete-Mixer. Anson R. Hannaford, Traverse City, Mich. Serial No. 403,926.

In a mixing machine, the combination of a drum mounted for revolution and having interior cleats, a scraper within the drum, supporting means for the scraper, said supporting means adapting the scraper to be moved toward and from the interior surface of the drum, a spring to move the scraper outwardly and engage the same with the inner surface of the drum between cleats, and means to intermittently move the scraper inwardly to cause the same to successively clear the cleats.

901,386. Derrick. Albert G. A. Schmidt, Chicago, Ill., assignor to the National Equipment Company, Chicago, Ill., a Corporation. Serial No. 447,130.

A bull wheel for derricks formed of structural metal bars and comprising a rim, two transverse bars connected at their ends to said rim and arranged in the plane of the wheel on opposite sides of a diameter thereof to receive and be secured to the foot of the derrick mast and brace-bars extending between said transverse bars and said rim, substantially as described.

901,431. Excavator. Thomas Fenwick, New York, N. Y. Serial No. 352,235.

A rotary excavator comprising separated supporting frames, a drive shaft mounted in each frame, and a series of tools secured to the shaft, said tools projecting in diametrically opposed relation from the shaft.

901,450. Multistage Centrifugal Pump. Huldreich Keller, Berlin, Germany, assignor to General Electric Company, a Corporation of New York. Serial No. 353,616.

In a device of the character described having a series of pumps or stages, the combination of a conduit supplying active fluid to the first pump or stage, a conduit supplying a less dense fluid to said stage to be compressed or condensed by the active fluid, means for passing said active fluid from one stage to the next, means for conducting the fluid acted upon from each stage to the next so that the less dense fluid is successively acted upon by the same body of active fluid, and means for driving the device.

INCORPORATIONS

Atlantic Hydraulic Machinery Company, Camden, N. J.; to manufacture pumping machinery, tool makers, founders and metal workers; capital, \$300,000. Incorporators: Ralph C. Busser, George H. Roth, Frank A. Kuntz, as above.

Beakeman-Black Engineering Company, St. Louis, Mo.; capital, \$300,000. Incorporators: F. E. Beakeman, George H. Black, C. E. Hamilton, Louis E. Seas, R. A. Marshall, St. Louis.

Dawes Bros., Inc., Portland, Me.; to make artificial gas; capital, \$10,000,000. President, C. E. Eaton; treasurer, T. L. Croteau; Clerk, J. E. Manter, all of Portland.

Ficklen Concrete Construction Company, New York, N. Y.; contracting and engineering; capital, \$25,000. Incorporators: William E. Ficklen, 1 Madison avenue; Albert K. Newman, William L. Bowman, 38 Park Row, all of New York.

Georgia-Carolina Clay Company, Wilmington, Del.; capital, \$500,000. Incorporators: Ernest L. Squire, F. L. Metter, F. A. Carter, Wilmington.

Lane-Hennessey Contracting Company, Syracuse, N. Y.; general contractors; capital, \$25,000. Incorporators: Thomas Lane and Joseph T. Lane, Syracuse; Michael F. Hennessey and John F. Hennessey, Skaneateles, N. Y.

Old Colony Brokers' Stone and Concrete Company, Boston, Mass.; to quarry and deal in broken stone, gravel and sand; capital, \$100,000. President, Richard W. Atwood, Chelsea; Treasurer, Eugene R. Atwood, 2 Kilby street, Boston; Clerk, John A. Phelan, Quincy.

PROPOSALS

FURNISHING FIRE HOSE

Office of the Board of Contract and Supply, Syracuse, N. Y., Nov. 2, 1908.

Sealed proposals will be received at the office of the Board of Contract and Supply, City Hall, until 1:30 P.M., Monday, November 16, 1908, for furnishing twenty-five hundred (2,500) feet of hose, in accordance with the specifications on file in the office of the Commissioner of Public Safety. A certified check for one hundred (\$100) dollars, payable to the order of J. D. Stemmler, City Treasurer, to be forfeited upon failure to enter into contract within five days' notice of award from the Secretary of this Board, must accompany each proposal.

FREDERICK T. PIERSON,
Secretary.

(19)

SANITARY SEWERS

Tuskegee, Alabama.

Sealed proposals for furnishing all labor and materials and constructing certain sanitary sewers will be received by the Mayor and Council at the office of the Mayor at Tuskegee, Alabama, at 3 o'clock P.M., November 16, 1908. The work for which proposals are invited includes approximately 3,755 linear feet of 8-inch sewer, 1,529 linear feet 6-inch sewer, and all manholes and appurtenances as shown in plans and specifications prepared by G. N. Mitcham, Engineer. All trenches are in unpaved streets, except 1,000 feet at outlet, the latter being through a field; very little sheathing required in trenches. Copies, plans and specifications furnished at a cost of \$5. \$500 certified check must accompany proposal as guarantee that bidder will enter contract if bid is accepted. Bond in the sum of double amount bid must be furnished in surety company. Right reserved to reject all bids.

O. S. LEWIS,
Mayor.

INTERCEPTING SEWER

Washington, D. C.

Office of Commissioners, District of Columbia, October 24, 1908.—Sealed proposals will be received at this office until 12 o'clock noon, November 16, 1908, for constructing Section D of the East Side Intercepting Sewer, Boundary to Brookland, District of Columbia. Forms of proposals, specifications and necessary information may be obtained from Chief Clerk, Engineer Department, Room 427 District Building, Washington, D. C.

HENRY B. F. MACFARLAND,
HENRY L. WEST,
JAY J. MORROW,
Commissioners, D. C.

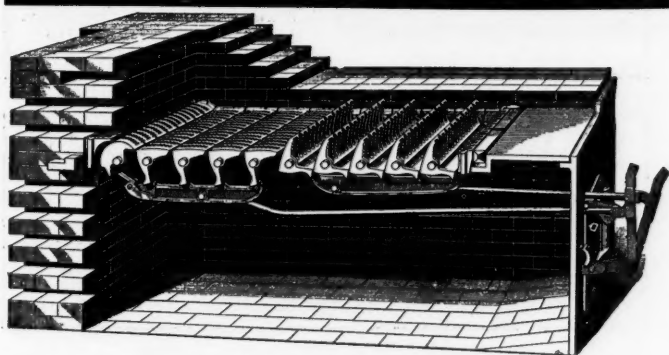
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Notice is hereby given that the property of the Newbern Lighting and Fuel Company at Newbern, N. C., being the gas plant, including the real estate, plant, fixtures and franchises, and all other property belonging to the Newbern Lighting and Fuel Company, will be sold to the highest bidder for cash at the hour of 12 o'clock M. on the 23d day of November, 1908, at the Court House door in Newbern, N. C., by the Receiver of the Newbern Lighting and Fuel Company, under the order of the Court made in that certain action, entitled "J. M. Cox against Newbern Lighting and Fuel Company," in the Superior Court of Craven County, N. C.

GEO. A. NICOLL,
Receiver Newbern Lighting and Fuel Company.
Newbern, N. C.

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(Rear half shows the Grate in its normal position)

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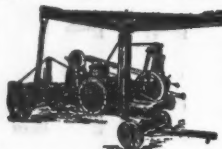
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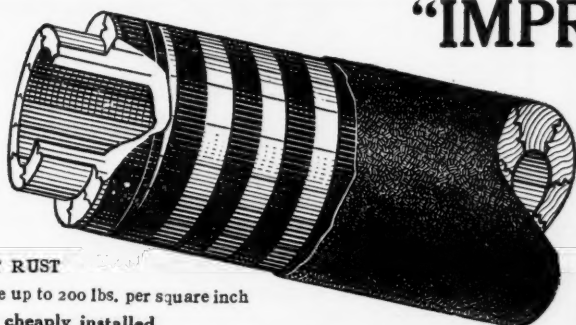


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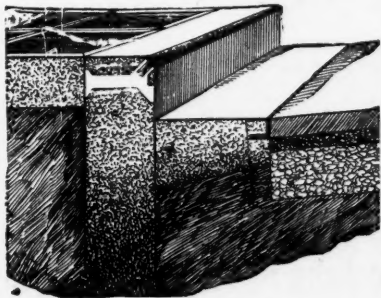
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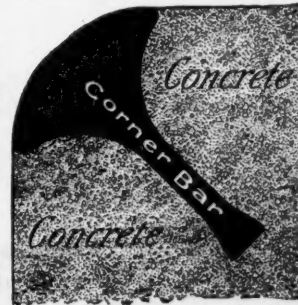


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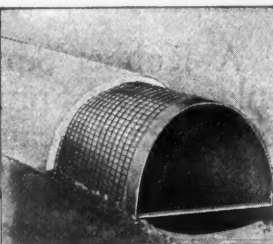
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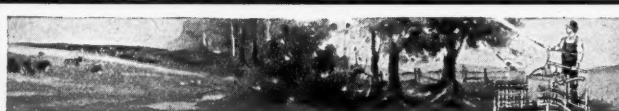
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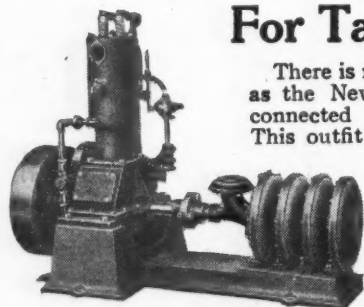
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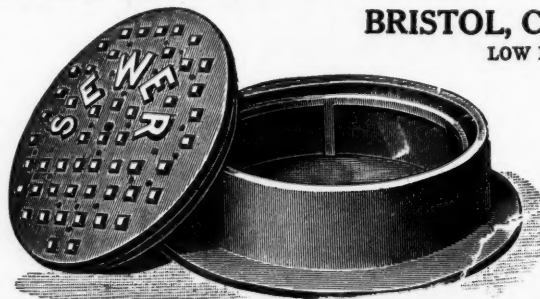
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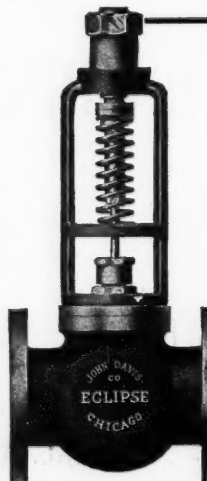
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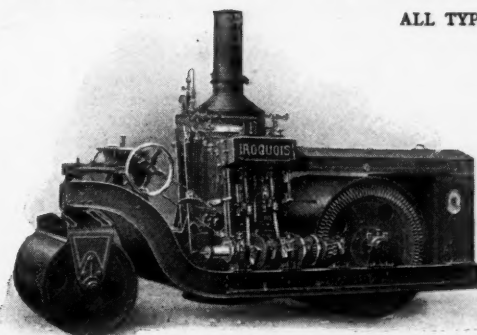


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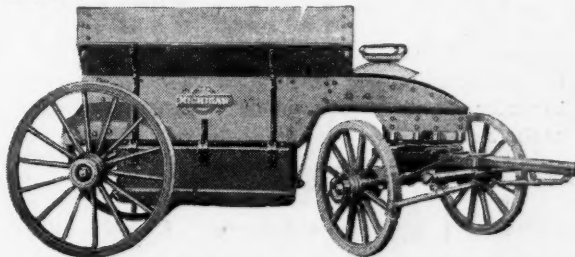
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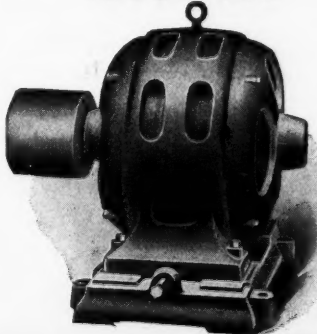
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Coffin Shear Sewer Gate
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Fig. 210
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Fig. 47
12" Coffin Flap Valve



Fig. 41
30" Coffin Flap Valve
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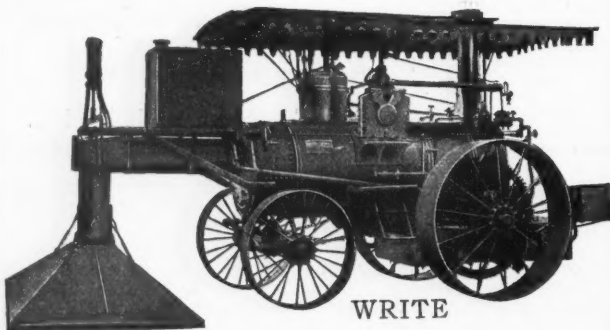
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